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CONSERVATION CASHES IN

There is a back-to-the-land movement in the Lake States. It is not settlers, however, that are now trekking into the wilds of northern Michigan, Minnesota, and Wisconsin. Agricultural settlement failed to reclaim the cut-over land of the northern portions of the region. For a time it looked very discouraging. The cut-over lands, not finding an agricultural market, were abandoned in large blocks for non-payment of taxes and passed into the ownership of the states and counties. Tax delinquency was assuming alarming proportions. The hope seemed to lie in the national government buying up large tracts for National Forest purposes or the states starting reforestation on the lands on a large scale. Even this remained mostly in an argumentative stage.

Within the last two or three years, however, clubs and other organized groups of people from Chicago, Detroit, and Milwaukee and other centers of population began to buy up fairly large blocks for country clubs and hunting preserves. Within the last few months, one well-known Chicago club bought 40,000 acres in the northern part of Michigan for a hunting preserve. Another tract of timber has just been recently purchased, a membership of 600 people secured, and enough money obtained to pay for the land, build a \$200,000 country club, and buy 40 saddle horses for a stable.

One hears now of land deals in northern Wisconsin equaling those in Florida. "Loaded up with land," writes one landowner, "we were somewhat skeptical on taking a block of lake frontage offered twenty months ago for \$1,325. There are cash offers now to sell that same land, without additional improvements, to net a profit of \$12,500." From being land poor two years ago, holders of upper Wisconsin and Michigan property are now thinking in terms of thousands and have a vision of making northern Wisconsin the summer home of the Middle West.

One of the most significant situations in the present demand for lake frontage is the clearing up of the acute delinquent land tax problem, which threatened bankruptcy to many of the counties now in the midst of the boom. "We are not worrying about the situation now for delinquent land titles are going like hot cakes and others are paying up," reports one county treasurer.

The present demand for lake frontage in the northern portions of Wisconsin and Michigan is not piecemeal but is for big tracts of land so as to plat into subdivisions or guarantee exclusiveness and shutting off the public. A deal involving less than 1,000 acres fails to attract attention. In the northern Lake States, the most attractive spots are those surrounding lakes and streams, since there are practically no mountains, and the shore property that is covered with green timber is especially in demand.

Conservation begins to cash in.

The northern sections of the Lake States at this rate will soon become what the Adirondacks have already become in New York to a large extent, a rich man's forest preserve.

The boom is on! It is claimed that 60 to 70 per cent of all the lake frontage in Wisconsin and Michigan has been already bought up by such organizations or is in the hands of people holding it for resort purposes.

What does it all mean for forestry? At the present stage its effect can be but beneficial. These hunting preserves and clubs will, first of all, demand effective fire protection, and some of them have retained foresters for getting the property in good productive condition. One even secured a biological adviser for care of game on their lands.

The large influx of summer people into that region will undoubtedly create a market for agricultural products and some agricultural land development will take place. These lands, well protected from fires and assisted by reforestation, will grow up to forests. They will function, however, largely as protection forests as the owners for a long time will probably continue to look upon them as mere game preserves rather than a source of timber.

It will undoubtedly affect the price of land for state and National Forest purposes unless the state and government will be willing to confine their purchases to the most unproductive sandy plains. It will

narrow the opportunities for recreation for the general public, and here lies the duty of the states and the government.

Before it is too late, some of the attractive forest areas should be acquired for public ownership and retained for the benefit of the public at large.

THE INTERDEPENDENCE OF UTILIZATION AND SILVICULTURE *

BY EARLE H. CLAPP

In Charge of Research, U. S. Forest Service

The idea of the interdependence between utilization and silviculture, although probably as old as the idea of silviculture itself, has remained far too much of an abstraction. Our present situation calls for renewed emphasis on utilization, not as a thing apart, not as an end in itself, not in the slightest degree to lessen but rather to increase the emphasis on silviculture. Existing utilization need not and should not be accepted as it stands or as a fixed condition. The possibility of improvement must be recognized and aggressive effort must be made not only to improve utilization but also to combine it with silviculture as supplemental means to the same end if both are to perform their full function in the development of forestry.

Research in the United States has possibly made more information available on utilization than on silviculture. Information on utilization, however, has very largely been demanded and absorbed by the manufacturing industries, but so far it has been called for only to a relatively small extent by practicing foresters or for direct application in silviculture. Have we not now reached the time for foresters to demand this information as much as or more than any other class of users? Have we not reached the time when the practicing forester should take an aggressive leadership in bringing an advanced technique in utilization to the solution of his problems as well as an increasingly intensive technique in silviculture, and when he should recognize both as essential phases of his technical equipment?

The first phase of the interdependence of utilization and silviculture to which I should like to call more detailed attention is that both are means or tools to the ultimate objectives in forestry. These ultimate objectives in the broadest national sense are: first, timber supplies ample to meet public needs with all that this means in human welfare and high standards of living. The second is to bring about those economic and social advantages which accrue from the profitable use of forest land for timber growing and to avoid the evil effects which inevitably result from land left idle.

* Read at the Annual Meeting of the Society of American Foresters, Madison, Wis., Dec. 16 and 17, 1925.

The growing and protection of timber, or silviculture in the broad sense of the word, is one of the means to these objectives. It is the means of which foresters first think and which they are inclined to emphasize exclusively. Only the exclusiveness of the emphasis need be questioned. But the utilization which makes silviculture possible and profitable, which bridges the gap between what the markets easily absorb and what the forest requires in cultural operations, is a second means which foresters can not overlook and which they should also use aggressively to the full limit of its possibilities. If they do not, silviculture will be crippled and forestry will lag far behind possible progress.

A second phase of the interdependence of utilization and silviculture is in one sense an application of that already outlined. Such information as we have shows that the present drain on our forests through utilization and destruction exceeds by several times the rate of replacement by new growth through the practically unaided silviculture of nature. It shows also that existing supplies have been so far reduced and the period for adequate replacement will be so long that nothing approaching present consumption can be maintained except through a great reduction of waste in logging and in practically all forms of manufacture and use. Better utilization becomes, therefore, a factor of fundamental importance in lessening the severity of the timber shortage already beginning and which will continue until silviculture can furnish new supplies. It is one of the potent means at hand by which during a period which promises to last through several decades we can materially help to maintain present standards of wood use.

A similar relationship exists between utilization and silviculture where future supplies are involved. From our entire area of forest lands we estimate a maximum productivity under intensive silviculture of some 27 billion cubic feet annually. The present drain is only slightly less. The problem is to take care of enlarged future needs, which promise to be greater than those of the present because of a rapidly growing population and of an industrial development which is still far from its maximum. Increased needs which our lands can not be made to grow under silvicultural practice may for some time at least be made available through the reduction of waste. Waste, necessary and avoidable in manufacture and use, has been estimated at some 15 billion cubic feet each year. The fact that through improved utilization nearly half of this waste could be added to the volume of wood

now put into actual use, without any increased drain whatever on the forest, helps to visualize the significance of better utilization as a supplement to silviculture in meeting future timber requirements.

Consideration of the interdependence of utilization and silviculture in order to be complete must be carried still further, from national forest economics to the forest itself. Silviculture aims at the maximum continuous production of a usable material from a given area. The intensity of the silviculture, and hence the size of the usable or effective yield depends largely on the intensity of utilization. The disposal of slash in the silvicultural treatment of the present crop is one instance of interrelationship. Slash disposal is now a serious problem in nearly every forest type and region of the United States. Either fire protection, insect protection or natural reproduction, or all three, are affected almost everywhere by the possibilities in the utilization of tops and limbs. In many instances good utilization will in the future substantially solve some of our serious slash disposal problems of to-day. Improvement, sanitation and salvage cuttings to remove diseased, defective, or bug-killed trees, or those crowded out during the growth of stands, depend on the possibility of profitable utilization. Our ragged natural stands are replete with areas which require such cuttings.

The utilization of what we now call inferior species, such as white fir, Western hemlock, and even Western larch, illustrates still another phase of interrelationship. Some of these species are now of low value because the properties of their wood are not fully known. In others, difficulties in the technique of manufacture or handling might easily be overcome as they have already been so strikingly in the seasoning of red gum. In others non-use may be charged directly to prejudice, with little or no basis. The leaving of such species in stands from which the more valuable species have been cut heavily must obviously influence the character of the new stands and all too often undesirably.

In the silviculture of new crops the species to be favored in natural reproduction or the species to be planted should be governed in part by what can best be utilized. The density of stocking at various stages of the development of forest stands because of the effect on knots, the density, and hence the strength of the wood, etc., should depend at least partly on consideration of utilization. Thinnings and release cuttings, such as the removal of gray birch and aspen over white pine, is practicable or not according to whether this material can be utilized. Whether or not the raising of a new crop in the immediate future can

be undertaken as a private enterprise on many large areas of cut-over lands which now, as in the Lake States, bear stands of small birch, aspen, jack pine, etc., depends on the possibility of getting some return.

Utilization everywhere will soon have to take what silviculture produces in second-growth stands. Except in parts of the South and in the West this is already very largely second growth, and in a relatively few years will be second growth almost exclusively. This will compel the utilization of second-growth trees of comparatively small size and in many cases of comparatively low quality. The problems in both utilization and silviculture will in many cases be entirely different in second growth from those in virgin stands.

Examples of interrelationship between utilization and silviculture could be multiplied indefinitely, because every species, type and region has them, but enough have been given to indicate that they point directly to the need for interrelated silvical and utilization research. This makes it desirable to refer specifically but briefly to a small part of the work which must be done along this line.

Research must cover such problems as the properties, handling and marketing of the so-called inferior species. Only in this way shall we be able to get entirely away from our old white pine superiority complex. An interrelated silvicultural problem is the determination of the extent to which the inferior species can safely be left on the ground from the standpoint of the new crop.

Research must increase the returns from all woods by reducing wastes, by reducing operating costs, by making it possible to use smaller sizes such as those from thinnings or second-growth stands. It must obtain a mass of information on the properties and qualities of a large number of species of wood as influenced by the soil and other environmental conditions under which they grow. Density, strength, the fundamental moisture and heat relationships which are so important in seasoning, are all influenced by growing conditions. Silviculture must so far as possible be helped through research to recognize the fundamental growing conditions and then to obtain the growing conditions which will produce the highest grade timber and thus insure best utilization and the highest returns. Low-grade hickory logs are now selling at the mill in the Ohio Valley for \$30 per M, while high-grade bring \$60. With the exhaustion of virgin timber, present differences in price may become even greater. Since good markets mean utilization, we must in general know as much as possible of the properties and utility of all kinds of woods in order that they may successfully

hold their proper markets in competition with the large and growing number of substitutes.

We need regional studies in many parts of the United States to focus upon specific sets of conditions all the knowledge available on utilization and interpret this utilization in the light of forest and silvicultural requirements. Regional studies should, among many other results, lead to groups of correlated or integrated industries based on supplies made permanent by silviculture, which will as a whole make profitable use of the entire forest output of the region. In this Sweden has set an example with coordinated saw and pulp mills, box factories, distillation plants, etc., which we in the United States have begun to follow only in a few instances such as at Bogalusa and Cloquet.

Our efforts should include studies of logging technique and machinery, and any other phases which may be required to adapt logging to silvicultural requirements. Our logging machinery, for example, has been developed solely with reference to output, and I know of no instance where the slightest consideration has been given to the perpetuation of the forest. Both machinery and technique could undoubtedly be devised which would save materially larger percentages of advance reproduction in the Western yellow pine type where advance reproduction is the key to silviculture. Our efforts might, by including the utilization problem along with silviculture at the experiment-demonstration forests which are being developed at our forest experiment stations, make these forests invaluable proving grounds for both classes of work.

It has been one of my great pleasures over a period of several years to watch silvical and utilization investigations in the Forest Service converge. The most recent research section of the Forest Products Laboratory was formed primarily to take utilization into the woods and to join it with silviculture. We have in our research programs a growing number of projects particularly of the more fundamental sort which require for solution the joint efforts of experiment station and laboratory staffs. Members of the two organizations find it increasingly necessary to go to each other for help and advice. It is becoming increasingly difficult to determine where one class of research leaves off and the other begins. These tendencies after all are but additional evidence of the essential unity of the two classes of investigations.

Who will conduct the investigations which may be required and bring out the important relationships? A part must, of course, depend upon the effort of trained research organizations, of forest experiment

stations, of forest products laboratories. Our utilization experts must, however, become more of silviculturists and our silviculturists more of utilization experts. But much can and should be done by the consulting forester and by the forester in charge of national or other publicly-owned forests. Is it not a part of the practicing foresters' job when silviculture is hampered or made impossible by difficulties in utilization to see that as many of these difficulties as possible are removed?

The status quo in utilization should not in itself without further effort be permitted to defeat or delay silvicultural developments. Many opportunities for better utilization and hence for silviculture will be found to exist which have not been disclosed by the blind and frequently very slow play of economic forces. When practicing foresters can not themselves obtain what is needed, they should seek it from research organizations with the same aggressiveness as industries now demand information to improve their manufacturing processes. They should see that research organizations are equipped to meet their needs and are kept in sympathy with their ultimate objectives and responsive to their calls. Forest products investigators have their own responsibility not only for the selection of projects which will aim first at promoting forestry but also for aggressiveness in seeing that their results go into practice.

Finally, foresters should keep in mind that just as soon as utilization research gets away from its ultimate background and guiding principle of maximum timber production and profitable use of forest land it loses its largest field of usefulness. Better utilization should remain primarily a means to an end, and its purely commercial side, important though it may be, should not be allowed to become an end in itself. Utilization when improved for its own sake, when not tied in with silviculture, may become a positive menace to the public welfare. It has led to the development of some logging machinery which in regions such as California has become a primary factor in forest devastation. It has led to the stripping of lands when selection cuttings should have left small trees. It may lead to other practices equally bad, or worse.

Foresters must not lessen in the slightest degree the emphasis on silviculture, on the need for more intensive knowledge and more intensive practice, but they can and should place vastly greater emphasis on utilization as an essential and interrelated means to the same end and thereby materially advance the progress of forestry. Frequently utilization is the key to the entire situation. They must recognize, in short,

that intensive knowledge of utilization, and the ability to attack utilization problems, must in the present status of our forestry development in the United States become an indispensable part of the technical equipment of practicing foresters.

THE ROLE OF UTILIZATION IN A NATIONAL FOREST POLICY*

BY CARLILE P. WINSLOW
Director, Forest Products Laboratory

By practically unanimous vote the Society has recently decided to give public expression to its views on matters of forest policy and legislation; it had previously approved the formulation of the definite principles for a permanent forest policy for the United States. These two actions are significant and encouraging; they are the first steps towards that truly effective leadership which the professional foresters should exert. They will inevitably necessitate a declaration of the Society's conclusion on the role of utilization in a permanent forest policy.

If a receiver took charge of a bankrupt organization, he would direct his attention to two essentials: (1) the assets, both present and future, and (2) the liabilities, both outstanding and prospective. Every effort would be made to increase the one and decrease the other; unnecessary expenditures would be curtailed, even though sanctioned by custom for a long time past.

Somewhat similarly, a community in a drouth stricken region not only would take stock of its available water supply and of means for its replenishment, but it would place controlling restrictions both on the nature and amount of its daily use. In other words, while attempting to replenish the supply in the water barrel, it would see to it that the bung was tightly in place—that all wasteful leakage was prevented.

So should it be with our forest problem. If, as has been so frequently proclaimed, we are threatened with forest bankruptcy, it is of critical importance that we institute measures to balance our ledger. While attempting to increase and stabilize our future assets, so also should we endeavor to reduce unnecessary liabilities resulting from wasteful practice. We should stop the leaks and drive in the bung in our reservoir of forest resources.

Furthermore, it must be recognized that the development of forestry in the ultimate analysis is largely dependent upon private enterprise. Capital will be devoted to the growing of trees just to the extent that it can be demonstrated to yield a profit. Profit in growing trees obviously depends directly on how much of the tree can be utilized.

* Read at the Annual Meeting of the Society of American Foresters, Madison, Wisconsin, Dec. 16th and 17th, 1925.

From this standpoint alone utilization stands in the foreground of the picture.

Another element which cannot be overlooked is the relation of utilization to good silviculture and management practice. In the Northwest the management of Douglas fir and white pine is greatly affected by the problem of utilizing the hemlock and larch; in the Lake states what to do with second-growth hardwoods and jack pine is a vital factor in the problem of white pine reproduction; in the New England region present inability efficiently to utilize hardwoods is greatly hampering the management and development plans for the future supplies of white pine. Truly good management is possible at present only in those limited localities which happen to be free of inferior species or are otherwise particularly favorable to close utilization.

These three essentials—balancing the forest ledger, insuring profits in growing trees, and efficient silvicultural and management practice—are the main reasons why we need better utilization. What is being done to get it?

It cannot be denied that during the past quarter of a century organized efforts to get better utilization have been relatively insignificant. While research in utilization by the federal government has kept pace with that in silviculture, co-ordinated and directed efforts in the utilization field have there practically ceased. Had the forestry movement of the United States restricted itself to this federal research, the situation today would be disheartening. Fortunately, such is not the case. Through federal and state forest services, through forest schools, through professional, trade and protective associations, and through extension services, much public interest and private enterprise has been aroused in replenishing our forest supplies. Under well conceived plans and legislative authority, it collectively has resulted in significant progress in such important essentials as fire protection, land acquisition, planting denuded areas, applying silvicultural practice, and encouragement of private forestry. The federal and state governments alone on such types of activity are collectively expending not less than \$10,000,000 annually, and plans are well laid for an extensive increase.

In contrast to this, attention to the utilization phase of the problem has been relatively insignificant. While rising stumpage values are tending to reduce wastes, deterioration of quality, competition and other economic factors are tending to increase it. Meanwhile, utilization research by the Federal Forest Service absorbs about five per cent of its expenditures exclusive of roads; utilization research and education

by the forest schools absorb a fractional amount of their efforts; and the utilization problem receives from the varied state forestry organizations a somewhat incidental attention. Beyond this, current progress in utilization is practically all the result of specific and immediate problems of commercial and industrial interests; it is receiving no organized and well conceived guidance or leadership from the forestry profession. Legislative measures recently passed, both by the federal and state government, and indeed any which are now known to be pending, in no adequate way recognize the importance of the problem or provide for its effective treatment. Even the much discussed principle of governmental regulation of private enterprise has publicly received the attention of the forestry profession only in its possible application to fire protection and forest reproduction, and without regard to its possibilities for accomplishing efficient utilization through the establishment of minimum standards of practice. If the principle is sound for application to timber growers, it is equally sound for application to timber users and consumers.

Succinctly stated, much has been accomplished in determining how utilization efficiency may be technically improved; little has been done to organize effort, or to create agencies, or to institute measures to aid in the wide application of improved practices or to lend guidance to such movement. Some significant and constructive steps are the creation during the past year of the National Committee on Wood Utilization; the quite recent creation of a similar committee for the State of New York; and the present comprehensive plans of the Forestry Committee of the National Academy of Science.

But much more is required adequately to meet the situation.

We need more utilization research, with increasing attention to fundamentals.

We need more utilization education, both for forest school students and for the industrial wood users.

We need a wider development by state and federal forest departments and extension agencies in giving advice, assistance, and stimulation to better utilization.

We need a re-creation or further development of organized industrial groups and trade associations to exercise leadership in securing improved utilization practices in industry along comparable lines to the fire-protective and grazing organizations.

Above all, we need a great impetus to economic studies, so that a sound policy may guide the trend of future developments of the forest-

using industries. Should the policy basically encourage the establishment of centers of diversified wood-using industries near a source of easily assured future forest supplies, or should it basically encourage the past practice of bringing the raw supplies to established industrial centers? If the former, we will have ultimately good utilization of current wastes with freight to pay on finished or semi-finished commodities; if the latter, we will have relatively poor utilization, unless freight rate structures can be developed to permit the transportation of low-grade and waste material to points permitting utilization. In either case taxation policies will play their part; they also need consideration from that standpoint.

Effective accomplishments along the foregoing lines will require the attention and action of many interests supported by adequate legislative and financial recognition by both federal and state governments. Leadership is needed and the forestry profession should supply it. No national forestry policy which does not fully recognize the utilization problem can be accepted as adequate; no national forestry program which does not fully provide for it can be considered truly effective.

RECENT DEVELOPMENTS IN FOREST PRODUCTS RESEARCH IN RELATION TO FORESTRY*

BY JOHN D. RUE

Forest Products Laboratory

It is my purpose to review with you some of the outstanding developments which have resulted from the investigation of the processes of manufacture and the application of forest products. I want to consider them especially as they relate to the management and reproduction of forests.

The manner in which forestry and the utilization of forest products are related is well known but there are seven points in the relationship which I would like to emphasize and to illustrate by concrete examples.

The *first* of these relationships is that of *material waste to period available for replenishing our timber supply*.

Much effort has been expended toward reducing the wastage of wood in the processes of manufacture because in so doing the service rendered by the available raw material is increased and the forester is afforded a longer period within which to grow more timber.

Manufacturing waste can be reduced by cutting small sizes of clear lumber from low grade lumber, slabs, and edgings. By doing the cutting at the saw mill transportation costs on the discarded material are largely eliminated. One of the obstacles which has stood in the way of effecting a reduction of waste by this means has been the multitude of sizes making up the bills of material in manufacturing plants. Investigation of several typical plants by members of the Laboratory staff has revealed the fact, however, that standardization of sizes can be effected with a material reduction in their number. The development of sympathetic cooperation between the manufacturer and the user of small lumber must be developed before standardization of sizes can be satisfactorily established and the production of small dimension stock from green lumber assured. Another obstacle in the way of manufacturing small dimension stock from green lumber has been the difficulties of handling the stock in connection with drying and transporting it. Practical methods, however, have already been developed and adapted to handling that type of lumber. With the exercise

* Presented at the Annual Meeting of the Society of American Foresters, Madison, Wis., Dec. 16-17, 1925.

of greater care in manufacture and in piling on the kiln trucks, material more uniform in size will be produced and a large part of the inherent tendency of such stock to crook will be overcome.

Waste of material is reduced also by improving the methods of seasoning. Air seasoning and kiln-drying as commonly practiced frequently result in defects which increase the proportion of low-grade lumber, the supply of which is already too large for easy absorption by the markets. Careful studies of the interrelation of atmospheric humidity, changes in humidity, and temperature on the one hand, and the moisture content and physical properties of wood on the other have led to the development of improved methods of seasoning which, if generally adopted, would result in a saving of approximately \$50,000,000 annually through reductions in stain, decay, checking, crook, warping, and other seasoning defects.

A more intelligent and extensive use of knotty timber can be made inasmuch as tests of structural timbers have shown that knots do not seriously affect the stiffness of the timber. It is quite safe therefore to use knotty timber in construction which demands of them stiffness rather than strength as in the case of joists and long columns.

The Laboratory has been a pioneer in the study of the construction of packing boxes. The study has led to improved designs which permit the use of less lumber without sacrifice of strength or serviceability. The quantity of lumber can also be reduced by the use of metal strapping. The application of such information not only reduces the drain upon the supply of timber already in high demand but results in material reduction to the shipper in his costs of transportation.

Several years have been devoted at the Forest Products Laboratory to the study of glues and their application in wood utilization. Among the important results may be mentioned the production of waterproof glues and the development of improved technique in the application of glue which make possible the production of plywood from small sizes of lumber and the larger use of otherwise undesirable material for cores in veneered stock. Glued-up construction also permits the use of laminated structural timbers, made from carefully dried segments of laminated material. The artificial timbers are far superior to natural timber containing unavoidable knots or seasoning defects.

Much of the degrade in lumber and of the loss in pulpwood due to rot in storage can be avoided by applying the information now available regarding proper methods of storing these materials. A study of the chemicals toxic to wood-destroying fungi has led to the ap-

plication of chemical preservatives which economically prevent the deterioration of mechanical wood pulp during six months and more in storage, thus reducing the drain upon the diminishing supply of spruce pulpwood.

The *second* relationship of utilization to forestry is that of *economic waste to cost of reproduction*. There are kinds of waste, the elimination of which may result not in a saving of material but rather in placing the manufacturer in a sounder economic position. A concrete example may make the point clear. Recent research has demonstrated that the quality and hence the value of chemical wood pulps can be raised by the application of improved pulping practices. The greater value of the product does not act to conserve wood but does place the manufacturer in a better financial position. The greater purchasing ability thus established permits him to go farther afield in his effort to secure raw materials and to bring into marketability stands of timber far removed from the point of manufacture. Moreover, it allows the timber grower to incur greater costs in the reproduction and harvesting of new forest crops.

An intimate study of the fundamental chemical process involved in the decomposition of wood under the influence of heat has led to the development of improved methods of destructive distillation effecting higher yields of chemical products. The wood distillation operators use hardwood of little value for other purposes. They are, however, in a precarious position, economically. Improving their economic position by developing higher yields is consequently a matter of importance because by avoiding the extinction of the industry there is retained to the forester an important outlet for low grade material.

The production of naval stores is an important by-product industry, vitally involved in the problem of the southern foresters. A careful study of the life processes of the pines as affecting the production of turpentine and rosin has led to modified methods of turpentinizing, which afford greater sustained yields of naval stores and which help to minimize possible degrading of the value of the trees. Increasing the value of the by-product crop can not fail to assist materially in meeting the cost of reproducing the timber even though it may not result in any appreciable saving of either the quantity or quality of wood.

Let us now turn to the *third* relationship, that of *uses for little used species to selection for reproduction*.

A detailed knowledge of the physical properties of individual species such as has been accumulated by years of patient investigation

at the Laboratory, frequently makes possible the satisfactory substitution of one species for another with a saving of costly lumber or the development of a source of supply more accessible to the consumer.

Years of painstaking investigation of the chemical reactions involved in the progressive disintegration of wood have led to the Laboratory development of a semi-chemical process which gives promise of practical application to gumwood, aspen, and possibly other hardwoods of low commercial value for the production of cheap print papers. Spruce pulpwood in the form of groundwood and sulphite pulps may be replaced in whole or at least in part by the newer product. Should the Laboratory results be fully substantiated upon a commercial scale, the northern forests would be able to provide a supply of pulpwood more nearly adequate for the needs of the domestic manufacturers of newsprint and catalog papers; and the southern forests could supply sufficient gumwood to form the basis of a branch of the paper industry new in that region. Efforts could therefore be directed toward the reproduction of species hitherto considered little better than forest weeds. In fact pulp and paper mills could in such cases base their entire operation upon gumwood forests operated on a sustained yield basis.

The naval store's operator has depended upon long-leaf pine for his raw materials. Longleaf yields the rosin and has the desired density for lumber but is of comparatively slow growth and is, therefore, unsuitable for rapid reproduction. Loblolly reproduces rapidly but is not dense, nor does it yield naval stores in quantity and quality adequate for practical orcharding. Fortunately investigation has revealed the fact that slash pine combines the qualities necessary to both lumber and naval stores operation together with satisfactory rapidity of reproduction. Slash pine is more sensitive to careless chipping and overcupping than is longleaf, but with the application of improved operating practices recommended by investigators these difficulties may be overcome and slash may prove to be the leading species of pine wherever it may be grown.

The *fourth* relationship is that of *uses for small timber to the practice of thinning and the period of rotation*. Increasing the value of small timber places the forester in a stronger economic position in the management of his forest and gives him greater economic latitude in the practice of thinning and in the development of short rotation crops.

Perhaps one of the largest users of timber will be the manufacturer of pulp. He can use small timbers of suitable species to excel-

lent advantage and can operate his own forests especially in the southern states, on a sustained yield basis with short rotations. He can also use for pulp the thinnings and limbs from areas devoted primarily to the production of saw timber. One company in Arkansas is preparing to follow that plan and to operate both pulp and saw mill with timber produced on a sustained yield basis.

The *fifth* relationship, is that of *uses for non-durable species to forest economy*. A ready market for ties cut from lodgepole pine, and from second-growth southern pines, and from western hemlock, as well as other species, is greatly limited because of their non-durability, a defect which is, however, overcome by the application of preservatives. Research has determined the chemicals to use and the method of application so that now the non-durable species are in demand and constitute a constructive factor in the forest program.

The *sixth* relationship, that of *uses for partially decayed timber to forest economy* is exemplified by the use of partially decayed pulpwood in the sulphite process. Laboratory tests, which have been fully substantiated by mill operation, have shown that partially decayed spruce and balsam fir can be used successfully for sulphite pulp so long as the wood retains sufficient mechanical strength to withstand the handling during barking, chipping, and screening. The quantity of pulp obtained is not materially less than would have been obtained from the same wood before it became decayed. Further study is needed to establish scaling rules based upon visible features so that proper selection can be made in the forest, thus avoiding unnecessary costs of handling and transportation. It must be borne in mind, however, that partially decayed wood is not suitable for pulping by the mechanical process.

We come now to the *seventh* and final relationship, that of the *correlation of non-competitive industries to complete utilization of timber stands*. Complete utilization in the region of mixed stands—a most important factor in forest management—can be facilitated by encouraging the establishment of a group of complementary industries. In the selection of these industries the facts which research has established in regard to the utility of species should constitute one of the important guides.

An excellent practical demonstration of the validity of that assertion is found at Cloquet, Minnesota—a town which has realized the limitations of its available supply of saw timber and is formulating and to some extent has put into practice a plan involving the development of a group of industries which are not competitive in their raw material

demands. The forest region provides principally softwood saw timber mixed with jack pine and aspen, together with some birch and maple. The saw timber is, however, too scattered to admit of economic logging without at the same time cutting and using the other species. The degree to which the correlation of industries has been established at Cloquet is evident from the following list (incomplete though it may be) of plants now in operation in the town: Saw mills for softwood lumber; a box shook factory using the lower grades of timber and some of the saw mill waste; a sulphite pulp mill using spruce and fir; a mill applying a new pulping process to jack pine and to aspen for the manufacture of special grades of paper; a plant making an insulation building material from saw mill waste and from pulp mill screenings; a mill manufacturing fabricated board using saw mill waste; and a toothpick factory using birch—a rather formidable array for a mere beginning in the development of the plan!

The intent of those promoting the plan is not merely to secure complete utilization of existing supplies but also to insure to the industries a continued life by the reproduction of aspen and jack pine as well as of spruce and fir, all on a sustained yield basis—rather a novel idea, the purposeful growing of aspen and jack pine!

I am confident that you will conclude with me, even from the sketchy outline that I have drawn, that persistent scientific search for more and better ways of making wood serve the public good has been crowned with commendable success and that the results have a very direct bearing upon the problems of forestry. The grower of timber and the student of forest products utilization are seeking to attain a common goal—that of securing to the public welfare the greatest economic and social values from our actual and potential forest areas. The common purpose argues for closer cooperation and more intimate co-ordination of effort in the two fields of activity.

STANDING TIMBER INSURANCE

BY W. R. BROWN

President, the Brown Company

The insurance of standing timber against loss by fire, had become an accomplished fact in foreign countries, particularly Scandinavia, before its introduction to this country. However, conditions surrounding the timberlands in these foreign countries were so different, that there was little analogy to American problems, and it was not until 1916 after six years of intensive fire protection, carried on by over 30 private associations, 15 state departments, and the Forest Service, that sufficient data was available to enable a reasonable guess to be made as to the extent of the risk involved in America, and led to the formation of the first Timberland Insurance Company. Very naturally it was found that this risk varied over such widely separated areas as the Pacific Northwest, the Province of Quebec, the Michigan-Wisconsin Region, and the New England states, but during the years of 1910-15, as far as data was attainable, the maximum loss in any one year, in any of these regions, did not exceed one-half of 1 per cent and in many instances was much less. This compared favorably with the usual loss by fire in other forms of property and gave a promise of being an insurable risk, provided sufficient area was obtainable, sufficient protection was afforded, and the average loss sustained. However, the extraordinarily dry and dangerous year which is bound to come along periodically, still remained the menace as it always will, and no insurance company dared to enter the business.

In the winter of 1917, a group of New Hampshire timberland owners, after careful consideration of the data then available, decided that as the loss by fire in the New England states was the best risk in the country and the total loss by conflagration remote, and as the loss probably would not exceed one-half of 1 per cent, and the cost of management an additional one-half of 1 per cent (which is the usual cost of doing business in insurance companies), that there was a possibility of writing a limited line of insurance on standing timber in the New England region at a 2 per cent premium. Consequently a group of nine companies and private individuals agreed to form the Timber Lands Mutual Fire Insurance Company of Portsmouth, N. H., of which I had the honor to be president, and subscribed a \$50,000 guarantee reserve. Subsequently a bill to incorporate this company was intro-

duced and passed by the New Hampshire Legislature of 1917 for the purpose of insuring standing timber against loss and damage by fire, lightning or other destructive elements or causes. This company did business for two years within the states of New Hampshire, Massachusetts and Vermont, writing a line of \$327,000 among 67 policy holders, on merchantable timber, young growth and plantations, at a flat premium rate of 2 per cent, which after the first year was reduced to $1\frac{3}{4}$ per cent and a further reduction to $1\frac{1}{2}$ per cent was in contemplation when the business was sold out to the Globe-Rutgers Co., who assumed all the engagements and were able to offer a larger line to the policy holders more adequately secured by capital reserve. In 1918, the capital invested was returned to the incorporators together with 5 per cent yearly interest for two years, and the company dissolved.

By this little essay into the fields of standing timber insurance, a number of lessons were learned which perhaps will be of value for the future.

It was learned, for instance, that the actual premiums paid for most kinds of insurance, pay little more than the losses and the cost of writing it, and that the real profit in the insurance business is made through the investment of the funds obtained, in other forms of high interest paying securities, which a small mutual company, such as the above, was estopped by their charter from doing, even had they the means and opportunity.

It was found that the laws permitting the formation of new insurance companies in the various states are stringent and exacting, and the formation of new companies is jealously watched by the old line ones already in the business. It is very difficult for a new company to do business in some states, except at a great expense and trouble to comply with their laws, and usually a large reserve of capital is required.

The profession of forest actuary having not yet come into existence, it was found that the probable relative danger in various sites and from various causes, and the extent to which fire would run in old growth, second growth or plantations, had not been determined, and that these risks had to be estimated by reasonable guesses as the company went along.

It was found that the high rates of a small company were not attractive to large timberland owners, because in proportion to the extent of the size of the timberland owners, they were insuring them-

selves at less than one-half of 1 per cent, and were not interested even at 1 per cent, if it were offered.

It was found that standing timber insurance appealed to certain classes of people particularly owners, who had half grown pine lots, on which in the course of a few years, the timber would mature to merchantable size. By effecting insurance on such immature timber, until it had market value, they assured themselves of a considerable property value, otherwise intangible.

Also timberland owners, who desired to borrow from the bank on their holdings, found such borrowing greatly facilitated and a lower rate of interest secured, by filing with the bank a standing timber insurance policy for the lot in question. Some banks even made insurance obligatory, when they learned that timberland insurance was available.

It was found that some people wished to hand down their property in standing timber to their relatives, assured from being wiped out by fire, and were willing to pay the premium for the benefit of their legatees.

It was found by experience that old growth timber and timber that had reached a merchantable size was a much better risk than plantations or immature timber, for the reason that, in proportion to the size the possibility of salvage was greater. Old growth was but slightly affected by the ordinary ground fire, whereas plantations and young trees of a few inches in diameter were completely destroyed by even a light fire, which ran with more briskness in young trees than in mature growth.

It was also found that the boundary lines on areas on which insurance was asked, were often obscure, uncertain and badly run, and that there was much difficulty in locating the exact areas. That an accurate estimate of the stand was not obtainable without great expense, and often resulted in a wide difference of opinion, between the owner and insurance company, concerning amounts and values. Consequently, it was decided to accept owners' estimate as to area, amounts and value, after a general survey of the property had been made, with a view of determining the risk involved. A co-insurance clause was inserted in the policy, which bound the policyholder to an approximately correct estimate and valuation of his stand to within 10 per cent, so that beyond 110 per cent of true value, he would be paying a useless premium. Under 90 per cent of true value, he would be the loser in the proportion, that the amount that he under-valued his stand, less

10 per cent, bore to the actual amount found by a careful estimate made after the fire, by agents of the company.

It was found advisable to attach to the policy, the original areas, estimates, and values, made by the owner in a form of a written statement. For plantations or unmerchantable young growth, this statement gave the pre-determined value per acre set upon it as the basis of loss settlement. For second cuttings or old growth, this statement gave a fair market stumpage estimate and value of all merchantable hardwood and softwood on the lands and did not include land values in any way, or young growth, too small to be merchantable. Final settlement was made on the actual value of the timber destroyed as found by the company adjuster, with the co-insurance clause working as described above. In case of a dispute over the salvage value of timber left, the company reserved the right to pay the value of the lot as set forth by the owner and attached to the policy, and the company could salvage it for its own account, if it so desired. The regular standard policy of insurance authorized in New Hampshire was used, with a rider concerning the special clauses applicable to timber insurance.

It was found that the best policy for a new company was to scatter its risks widely in relatively small units. Each unit was insured for its full value. A larger unit area could be taken, if insured for only part of its value, the owner acting as the co-insurer of the rest. These units were kept one-half mile apart if in a continually wooded area, and in broken country, were separated by a farm, lake, sizable river or other fire break.

It was found that an additional premium charge was required for a policy taken out only for the dry season or for carrying the owner over a dry season, when the owner decided to cancel his policy at the close of it and not give the company the benefit of the wet season.

It was found that care must be exercised in the acceptance of risks and a higher premium charged or avoidance made of land, which was close to the railroad right-of-way, close to recent slash, close to portable mills, close to large cities and picnic grounds, and some other unfavorable environments.

It was found that periodical inspections were necessary to determine whether owners had added to the risk of their lands by cutting and slash, the establishment of portable mill, putting up dangerous buildings, etc., and a clause was inserted in the policy, that such added risks vitiated the insurance, unless special permits were secured in advance for them.

It was found that the proximity of timberland to market and the ease of operations had not only an effect on its value, but upon its insurability, as the possibility of salvage on remote land was much less.

It was found that the old growth proved the best risk both on account of its resistance to the spread of fire and the especial care that was taken of it, and on account of the large salvage return possible by prompt logging, if in a reasonable proximity to market. Complete loss was rare. Fire did not eat into old trees, often hardly penetrating the bark 10 feet from the ground. Eighty-seven and four-tenths per cent of the risks were written in old growth. Second cuttings were found to be more dangerous on account of the large amount of slash commonly on the ground for five to ten years, and the presence of many immature trees that constituted a complete loss when burned. Also on account of its low value, this land was less adequately protected. However, when burned its loss was correspondingly low. Eight and four-tenths per cent were written in second cuttings. Plantations were the greatest risk, being subject to a complete destruction by a slight fire. Four and two-tenths per cent were written in plantations.

From all of the above and from much we did not find, but which will develop in actual practice, it can be seen that in the future, varying rates should be charged for each risk, based on the size, position and character of the tract, the size, distribution and condition of the species found upon it, the extent of protection afforded, and the accumulated experience gained by all insurance companies doing this line of business, according to their actuarial tables. This immediately brings to the fore, the necessity of professional standing timber insurance actuaries, who should be trained foresters having had previous practical experience in timber cruising, estimating, surveying, operating and trading.

There are now three companies actively engaged in writing forest fire insurance in America, the Automobile Insurance Company of Hartford, Globe & Rutgers of New York, and the Home Insurance Company of New York. A fourth, the Commercial Union of London, has had the matter under consideration. Because of the want of extensive data on the subject, companies are strict in their requirements, and charge a high rate of premium. Rates usually vary from $1\frac{1}{4}$ to $2\frac{1}{2}$ per cent for merchantable standing timber, and from 2 to $3\frac{1}{2}$ per cent on plantation insurance.

Merchantable timber is defined as timber six inches or greater in diameter at four and one-half feet from the ground. The term planta-

tion is construed to mean living trees planted by hand as distinguished from second cutting, which is coming from seeding without personal supervision and planting. Standing timber is usually valued at present cost, and the plantation at the cost of planting, plus simple interest to date.

Basic rates are made for usual risks and an extra made for unusual risks, such as proximity to railroads, recent slash, etc., and credits are given for approved state fire protection, mountain lookout stations, patrol, fire-fighting apparatus, placarding, etc.

Risks are written upon application made out and signed by the assured, which application becomes a warranty under the contract, a photostatic copy being attached to the policy. The applicant upon signing the application assuming that he is already familiar with the standard fire contract of his state, and is fully informed regarding the nature of the policy he will receive, if his application is accepted, and said policy issued. Some companies express their desire not to insure lines greater than \$25,000, subject to one fire. The insurance now being offered covers the six New England states, and New York, Pennsylvania, New Jersey, Delaware and Maryland.

It should be here noted that in the past few years, much additional information has been gathered as to the extent and risk of fire in the Eastern states. Also that great strides have been made in the ability to cope with fire when it does occur. Intensive studies are also being made by some of the state departments and by the federal government, concerning the relationship between moisture content of the air, and the springing up of forest fires, whereby an observation of the weather conditions, wind, evaporation, the dryness of the duff as shown by the duff hygrometer, and other elements, will give reasonable warning in advance of approaching seasons of danger, and give opportunity to send out warnings and take extra precautions.

From the above, I believe that if standing timber insurance is to be effective on a large scale, it must have the backing of either immense capital, or the subsidy of the state or federal government for a sufficient period, to prove the actual smallness of the risk involved over great areas, and enable it to get upon its feet.

In order to bring in great tracts of territory, the premiums offered must be very low and correspond somewhat to those offered to factory mutuals. Probably this result would be brought about gradually by the old line insurance companies extending their business, as experience gives them courage to reduce their premiums, coincident with extended

area. In order that standing timber insurance may become a fact, a standard expenditure per acre for fire protection must be insisted upon by law, wherever fire insurance is carried, to bring in the recalcitrant owner, whose neglected land would be a menace to the community as a whole. In New England one cent per acre per year seems to render satisfactory results.

The actual carrying on of protection of land from fire should be avoided by insurance companies on account of the legal liabilities involved in the responsibility assumed.

A portion of the cost of protection of forest land from fire should be borne by the public, as the fire starts often from natural causes like lightning, etc., and the loss in a general conflagration affects not only the owner of the timber and his industry, but all other industries in the state, and serves to depreciate all values in the state in general. Hurricane, insect and fungus devastations should not be included in the policy until statistics covering the risk have been established, and this is doubtful.

I hope that statistics covering timber loss by fire will be started soon by an actuarial board made up of the State Foresters of the Eastern states associated with representatives from the fire insurance companies, the U. S. Forest Service, and others. This board should correlate the data and experiences gathered from all sources and publish them with conclusions for the benefit of the country at large.

I believe that timber insurance will be taught as a course in all forestry schools one of these days, as part of the training of a forester, and that sooner or later, the profession of forest actuary will become common with a practice extending over a wide field of standing timber insurance written by most of our old line companies.

When we consider that standing timber is one of the five great values in our country, and that this is the only form of property which has been uninsurable in the past, due to certain misconceptions as to the extent of the risk and the vast capital required to go in for it, it will be seen what an immense field of new insurance lies ahead of the few companies who have had courage enough already to write limited risks, and when the field is actually covered, what immense assistance forest fire insurance will be to the practice of forestry.

THE FOREST FIRE SITUATION IN NEW ENGLAND*

BY AUSTIN F. HAWES
State Forester of Connecticut

REVIEW OF FIRE SITUATION

According to the so-called Capper Report published in 1920, New England now contains about twenty-five million acres of forest. Of this about eight per cent is virgin timber, chiefly in Maine with scattered areas in New Hampshire and Vermont. An additional 36 per cent contains lumber or pulp wood, although it can not be classed as virgin timber. About one-third of the total forest area is producing nothing but fuel wood; and 22 per cent is classed as non-productive. It is safe to say that this large area of five and one-half million acres was classed as non-productive because it had been burned once or more during recent years.

Statistics gathered by the U. S. Forest Service¹ show that during the past nine years New England has had an average of 4,242 fires annually and that the average area burned is 110,000 acres. At the present rate, therefore, we are burning over one million acres in a decade, although some of this land is undoubtedly burned again and again. There can scarcely be a question that conditions are much better than they were formerly and it is, therefore, quite within the range of probabilities to say that five and one-half million acres have been so badly burned within recent decades as to be practically unproductive.

While the number of fires has probably not diminished, but may even be on the increase, the area burned is being gradually reduced. While 42 per cent of the 20,000 fires in the United States burn over 10 acres apiece, it is encouraging to note that only 25½ per cent of the New England fires are in this class. The average area per fire is 26 acres varying from 11 acres in New Hampshire to 190 acres in Maine. In relation to the forest area needing protection, Vermont has the best record, as only 1/20 of one per cent is burned annually, while in Connecticut two per cent is burned. In other words the fire hazard in the Nutmeg State is 42 times as great as in the Green Mountain State. We may expect, however, that the difference between the states will tend to lessen as time goes on and the northern forests are reduced to cut-over areas.

* Read before Second New England Forestry Congress, Springfield, Mass., Dec. 11, 1925.

¹ See Table I in Appendix.

NORTHERN AND SOUTHERN NEW ENGLAND COMPARED

There are several factors which account for the great divergence in fire hazard between southern and northern New England. The more important are the following:

1. Climatic

Snow comes earlier in the fall and lasts later in the spring in the north. The larger amount of snow melting keeps the north woods damp almost until vegetation begins. In the south the ground becomes thoroughly dried out early and there are often days of very low humidity before vegetation has started.

2. Character of Forest

The oak leaves in the south, whether they fall in autumn or remain on the trees until spring, are in an inflammable condition for spring fires. In the north the leaves of maple and birch are well matted down by the winter snows. The greater percentage of evergreens in the northern forests and the fact that a larger portion of the forest is composed of old trees also tend to keep the floor of these forests in a less inflammable condition. Sandy land covered with low brush, like that of Cape Cod, becomes very dry, and when this brush still carries the dead oak leaves, it is extremely inflammable. Most of our southern forests are still full of dead chestnut which make a very difficult fire to extinguish. Southern New England also has a stiff grass which remains standing over winter and is very inflammable in spring.

3. Railroads

Since one-third of our fires are of railroad origin as compared to one-eighth in the United States as a whole the railroad situation deserves special consideration. In Vermont the railroads pass chiefly through agricultural valleys and therefore set very few fires. In southern New England conditions are strangely reversed. Much of the best farm lands are on the gently sloping hills while the valleys traversed by the railroads were formerly wooded and are now chiefly brush covered. Thus the Naugatuck and Shepaug Valleys of Connecticut have suffered from repeated railroad fires during the past 75 years until the soil is now very much impoverished.

Southern New England probably has more miles of railroad track in proportion to its area than any other section of the United States, and these roads carry more trains than those of the north. Tending to counterbalance these factors is the increased electrification of lines and the growing use of gasoline cars. It is expected that the proportion of

railroad fires will fall off during the next decade because of these factors.

4. *Population*

The dense population of southern New England is believed to be a less important factor in the setting of fires than the character of the population. In the first place a large part of the population is urban, but is getting into the woods more and more on Sundays and holidays. These people are unacquainted with woods conditions and the ease with which a serious fire may spread. There is also a very large foreign-born population ignorant of our laws and institutions.

CAUSES OF FIRES

As has already been pointed out, the railroads have been responsible for 35 per cent of our fires during the past decade. Too many fires are still reported as of unknown cause; namely, 29 per cent as compared to 16 per cent for the entire country.

Next to the railroads, camp fires and smokers are the chief cause of forest fires, they being together responsible for 13 per cent. The proportion of fires set from this cause is likely to increase especially because of the increasing use of paper matches which hold fire much longer than those made of wood.

Brush burning remains the cause of about 10 per cent of our fires. This includes a considerable number of fires set in the spring to burn dead grass. A campaign of education against this injurious practice might be beneficial.

Incendiarism, lumbering and lightning are each responsible for about one per cent of our fires and play a much less important part than in most sections of the country.

DAMAGE CAUSED BY FIRES

The average reported damage for the New England states amounts to \$556,917 or 2.7 per cent of the entire damage by forest fires in the United States. This damage is divided into two items by the Forest Service; damage to timber \$478,313 and other damage \$78,604. In a recent study of fire damage in Connecticut, it was found that nearly three-quarters of the damage was to reproduction; about one-eighth each to soil damage and timber damage; with possibly one per cent each to forests products and buildings including fences. Of course in northern New England timber damage would form a greater proportion and damage to reproduction would be proportionately less. As we have no

figures on the valuation of all our New England forests, it is impossible to estimate the ratio of damage to total value. In general, however, it may be said that this ratio is less than the ratio between area burned and the total area. For example in the National Forests having an aggregate area of 157,000,000 acres one-quarter of one per cent of the area was burned in 1922, but only one-twentieth of one per cent of the actual value was destroyed.

So in the state forests of Connecticut now aggregating 13,000 acres worth \$85,000, the average area burned during the past decade has been nine-tenths of one per cent of the total area; while the damage has amounted to only four-tenths of one per cent of the total value.

On this basis it is safe to assume that the annual damage by fire to New England forests does not exceed four-tenths of one per cent of their value.

ARE WE MAKING HEADWAY AGAINST FIRES?

Yes, decidedly.

There are probably as many fires as ever. Certainly 4,200 a year is too many. However, I doubt whether the number will be greatly reduced. We are getting more complete returns than formerly. Small fires are now reported which were formerly overlooked.

Headway is being made in keeping the fires down to small areas. Thousand acre fires are becoming unusual whereas a decade ago they were taken much as a matter of course. Even now more damage is done by the few fires of over 100 acres than by the many small fires. In Connecticut this spring more area was burned over by 47 fires in the 100 acres class than by the 683 lesser fires.

Connecticut has suffered more than any other state and Hartford county has been the worst county in this state. During the 14 years for which records have been kept, the percentage of area burned has been reduced from an average of five per cent to three per cent of the total forest area. Similarly the average percentage burned for the state has been reduced from 3.3 per cent to 2 per cent per annum.

PRESENT STATUS OF FIRE CONTROL

Each state has an organization of fire wardens for the prevention of forest fires headed up at the State Capitol. In most states the wardens are appointed locally by the selectmen, but with the approval of the State Forester. In Connecticut they are now appointed directly by the State Forester and are, therefore, state rather than town officials.

Some fifteen years ago Maine embarked upon the policy of building and maintaining lookout stations on points commanding extensive views. These stations have become a generally accepted and valued agency in detecting and reporting fires in all six states. There are at present 166 in operation covering an average of 150,000 acres of woodland besides the open land overlooked.

In the early days, especially in Massachusetts, an attempt was made to get the towns to provide themselves with wagons fitted with fire fighting equipment. The auto truck has now superseded the horse and wagon and we have in New England about 35 trucks well equipped for immediate response to fire calls. This equipment consists in shovels, rakes, axes, wire brooms, and special fire tools as well as hand pumps and chemicals. Massachusetts has specialized more in chemicals, while Connecticut has found hand pumps most satisfactory.

The most recent development in fire fighting is in the increasing use of high-powered gasoline pumps with considerable lengths of hose. There are now over 40 of these in operation. We have, therefore, approximately one truck and one gasoline pump for every 625,000 acres of woodland.

FEDERAL AND LOCAL CO-OPERATION

Ever since the passage of the Weeks Law by Congress in 1911 the New England states have received financial assistance from the federal government. This assistance is now increased under the appropriations of the Clark-McNary Law. In 1924 this federal assistance amounted to over \$46,000 for fire prevention against expenditures by the six states of \$310,000. In the same year the towns and counties participated in the cost of fire prevention to the extent of \$102,000 while private expenditures amounted to \$36,000. This latter item is chiefly accounted for by the expenditures of the railroad companies in extinguishing railroad fires. The total expenditures for fire prevention and extinguishing were, therefore, nearly one-half million dollars, or an average of two cents an acre of woodland.

As a means of getting more active support of the forest land owners themselves co-operative protective associations were first organized in New Hampshire several years ago. There is now such an association operating in each of the northern states. The area covered by the Maine Association is 1,328,895 acres on which the owners pay a small annual assessment of $1\frac{1}{4}$ mills per acre. The associations of New Hampshire and Vermont cover an aggregate of 1,055,000 acres on

which the owners are assessed one cent an acre. In Connecticut there are four small associations controlling 50,000 acres on which the owners are assessed four cents an acre. In the latter case the state meets the private assessment so that there is available eight cents an acre for protecting these particular areas in addition to the amount expended for extinguishing fires. Altogether, therefore, about one-tenth of the forest land of New England receives special protection.

CO-OPERATION OF WEATHER BUREAU

More and more we are coming to realize that weather conditions, atmospheric humidity and wind velocity are the controlling factors in the fire situation. The U. S. Weather Bureau has now undertaken to notify the forestry officials of the various states of approaching dangerous conditions. There has not yet been sufficient time to test the value of this service in New England. It will undoubtedly be useful in having wardens prepared for action and in controlling the issuing of permits. It is, however, doubtful whether it will accomplish as much here as in parts of the West where the large lumber companies regulate their operations by such predictions. The lumber operator is not an important cause of fires in New England.

CO-OPERATION OF NORTHEASTERN FOREST EXPERIMENT STATION

The various New England states are co-operating with the U. S. Department of Agriculture through the Northeastern Forest Experiment Station at Amherst in the study of the fire problem. A careful analysis of fire statistics is under way as well as a study of the inflammability of ground cover in different forest types. It is hoped that through these studies real progress may be made in methods of fire fighting and forest protection.

STATE REGULATION OF PRIVATE CUTTING AND SLASH DISPOSAL

1. *Cutting along Roads and Railroads*

In Maine the growth must be left uncut, or the slash resulting therefrom must be disposed of *within 50 feet of the right of way of a railroad or the center of the wrought portion of any public road.*

In New Hampshire no inflammable slash or bushes are to be left from operating *within 50 feet of the edge of the traveled part of every highway.*

In Massachusetts such slash shall not be left on the ground *within 40 feet of any highway or railroad location.*

In Connecticut no cut brush or tree growth is permitted to remain within *15 feet of the traveled portion of any highway*.

2. *Cutting incident to building Wire Lines*

In Maine slash resulting from such construction must be disposed of in such manner that inflammable material is not left *upon the ground*.

In Massachusetts slash from such construction must not remain on the ground *within 40 feet of any woodland, highway or railroad location*.

3. *Cutting adjoining Woodland owned by Another*

In Maine outside the Maine Forestry District (i. e. in southern Maine) persons cutting must dispose of the slash *within 50 feet of the line of cutting on the sides towards woodlands owned by another*.

In New Hampshire a similar regulation applies *100 feet around mills and adjoining property lines*.

In Massachusetts such slash must be removed from a strip *75 feet around a portable saw mill and within 40 feet of any woodland*.

PRESENT TENDENCIES

The methods of preventing and extinguishing fires naturally vary considerably in different parts of New England. A trial of 15 to 20 years has proved certain methods better adapted in one region than in others.

Lookout towers are generally considered the most effective method of getting quick action at fires while patrols and general educational methods are encouraging agencies for reducing the number of fires.

FIRE PREVENTION VS. FIRE CONTROL

In perfecting our organization and machinery for fire control, we should not lose sight of the fact that practically all of our fires are man-caused, and that with very few exceptions, they are due to carelessness. Public sentiment in Europe does not tolerate forest fires because the public recognizes the value of forests to the community and state. We can bring about such an attitude of mind in New England through educational measures. Each state is doing something along this line through literature, posters, lectures, etc. The co-operative protective associations are a most useful agency. They stimulate prosecuting officials to enforce the laws and create among irresponsible people a realization that public sentiment is against carelessness. Massachusetts is now undertaking a new experiment in intensive education to be confined to a few counties on Cape Cod, the most hazardous section of New England. Local committees are to be organized to

develop plans for fire prevention. In other words an attempt will be made to make forestry a subject of leading importance on Cape Cod. Too often there is a feeling that waste land is not worth protecting. The public attitude must be changed in such communities.

FIRE PREVENTION A STEP TOWARD FORESTRY PRACTICE

Too much stress has been placed upon fire prevention of itself and too little on the big problem of timber raising of which fire prevention is only one feature. Perhaps we are putting the cart before the horse. If we reforest our waste lands and improve our existing forests these areas will become dignified in the eyes of the public, and a sentiment against fires will gradually grow akin to the sentiment in Europe. Forestry practice in New England need not wait for the elimination of fires, but must go along with it.

CONCLUSIONS

We have ample proof that the present expenditure of \$500,000 or two cents an acre is not sufficient to give adequate protection to New England forests. An equal amount is needed for preventive measures. Such a sum properly distributed throughout the six states for purposes other than fire fighting should provide adequate protection. This money should be available for the following purposes:

1. Employment by the states of a sufficient number of district foresters to supervise the local fire wardens and build up a more efficient force. (Wardens should be appointed by the State Forester.)
2. Constructing and maintaining additional lookout stations in territory where there is less than one station to 150,000 acres of forests.
3. Purchase of trucks and other fire fighting equipment so that there would be at least one complete outfit for every 500,000 acres.
4. Employment of patrolmen to enforce the forest laws and watch dangerous locations at especially hazardous times.
5. Encouragement of land owners in cleaning out old wood roads, providing water supplies and in other ways reducing the fire hazard.
6. Educational measures through publications, posters, movies, lectures and special instructions to school children. This educational work must treat fire prevention as one phase of the larger question of forestry.

TABLE NO. I
AVERAGE NUMBER OF FIRES PER YEAR
For past nine years

	Number of Fires Per Annum
United States	47,147
Maine'	160
New Hampshire	611
Vermont	97
	<hr/>
Massachusetts	2,510
Rhode Island	58
Connecticut	806
	<hr/>
	3,374
	<hr/>
Grand total for New England	4,242 ¹

TABLE NO. II
FOREST FIRES BY CAUSE IN NEW ENGLAND AND UNITED STATES
Average per annum for last nine years

Cause	New England Number of Fires	Per Cent	United States Per Cent
Lightning	15	.4	7.3
Railroads	1,494	35.	12.8
Camp fires and smokers.....	563	13.3	17.5
Brush burning.....	451	10.6	15.1
Incendiary	75	1.8	18.2
Lumbering	29	.7	5.9
Miscellaneous	391	9.2	7.3
Unknown	1,224	29.	15.9
	<hr/>		<hr/>
Total	4,242	100.0	100.0

TABLE NO. III
NUMBER OF FOREST FIRES BY SIZE IN NEW ENGLAND AND UNITED STATES
Average per annum for last nine years

	Under ¼ Acre	¼ to 10 Acres	Over 10 Acres
United States.....	9,692	17,333	20,122
Per Cent.....	20.5	36.8	42.7
Maine	20	65	75
New Hampshire	109	400	102
Vermont	13	60	24
Massachusetts	309	1,716	485
Rhode Island .....	...	29	29
Connecticut	52	404	350
	<hr/>	<hr/>	<hr/>
New England.....	503	2,674	1,065
Per Cent.....	11.6	62.9	25.5

¹ This is 9% of all the forest fires in the United States.

TABLE NO. IV

AREA BURNED IN NEW ENGLAND AND UNITED STATES

Average per annum for last nine years

	Forest Area, Acres	Total Area, Acres	Area per Fire, Acres	% Burned of Area Needing Protection
United States.....	10,514,431	14,639,973	...	...
Maine	25,816	30,339	190	.20
New Hampshire.....	4,930	6,951	11	.15
Vermont	1,349	1,823	19	.05
Massachusetts	17,793	35,667	14	1.08
Rhode Island.....	3,448	4,107	71	1.47
Connecticut	27,388	31,372	39	2.09
New England.....	80,714	110,259	26	.44

TABLE NO. V

DAMAGE BY FOREST FIRES IN NEW ENGLAND AND UNITED STATES

Average per annum for last nine years

	Damage to Timber	Other Damage	Total Damage
United States.....	\$14,495,157	\$5,650,408	\$20,145,565
Maine	155,427	10,464	165,891
New Hampshire.....	45,518	14,691	60,209
Vermont	6,292	2,052	8,344
Massachusetts	123,842	29,082	152,924
Rhode Island.....	29,820	3,091	32,911
Connecticut	117,414	19,224	136,638
New England	\$478,313 ²	\$78,604	\$556,917 ³

² Includes damage to young growth. Indirect damage to soil, water, scenic values not included.

³ This is 2.7% of all the damage in the United States.

ANALYSIS OF DIRECT SEEDING METHODS

BY W. M. ROBERTSON

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There seems to be no question that, in general, reforestation by planting has been more successful than by direct seeding. It is possible to eliminate losses due to rodents and birds, to select the stock, to nurse the plants through seasons of drought until they are capable of withstanding such seasons.

Planting, however, necessitates a nursery; nursery care for two, three or four years; possibly transplanting; lifting and transportation of stock to the field; preparation of the soil and planting; the employment of skilled labor for a period of years, all of which means large overhead costs. Conducted on a large scale, with nursery established adjacent to the planting ground, it is conceivable that planting can be conducted at a cost not greater than that of direct seeding, success of survival taken into account.

It is evident, however, that the requisite capital is not always available to conduct a planting program on an economic basis, when unless a more simplified method is available, reforestation must needs be left to nature. When transplants must be transported long distances from the nursery, costs become excessive, danger to the stock is increased.

Toumey¹ shows that direct seeding methods are being successfully practiced in Europe, United States and Canada. It is true that there have been many failures attributable to rodents, to drought, to unsuitable species, and to incorrect methods adopted. An analysis of the failures and successes indicates that direct seeding is of limited applicability. Nevertheless, it has a definite place in the scheme of reforestation, where small seeded species are adaptable (small seeds are not so liable to loss by rodents); where long periods of drought are not general; in stony shallow soils where planting is difficult; or in comparatively inaccessible localities where cost of handling transplant stock is excessive.

Toumey states:² "At the present time foresters generally concede that the particular circumstances of each case should determine the form of artificial reproduction to practice. Planting is generally conceded to be the quickest, safest and easiest known method of restocking. Its economic application, however, must always be a determining factor in its employment."

¹ Toumey, J. W. "Seeding and Planting," page 223, 1916.

² Ibid, page 82.

Frombling (Germany)² believes that direct seeding is better adapted for the reforestation of recently cut-over and burned areas than for afforestation. It is often used on very rocky ground where planting is difficult.

"In Scandinavia where more than one-fourth of the total artificial regeneration is by direct seeding, coniferous forests are re-established by this method at less cost than by planting. It is generally favored by private foresters because of its comparatively low cost, although there is more or less danger of failed places, of irregular height growth, and the overcrowding of seedlings."

Following his recent visit of investigation to forests of Europe, Mr. L. S. Webb, Forester for New Brunswick, reports that in France, "in cases where no provision has been made for regrowth, as in emergency war cutting, new growth has been started through sowing seed rather than planting, the former method being cheaper and serving the purpose." This was of especial interest in view of the reseeding experiments in New Brunswick.

Dr. Fankhauser³ states that the Swiss Government has found planting unsuccessful in the High Alps because—

1. Stock grown in nurseries in low altitudes was ready for planting before snow had disappeared.
2. Heeling-in over winter spoiled plants due to snow fungus.
3. Heeling-in under snow in spring dried out the roots.
4. Nurseries at high altitudes brought damage from heaving, were expensive, were too slow.
5. Costs of transplanting and planting were prohibitive (\$50 to \$80 per acre).

Direct seeding has been successful. 800 pounds of seed were sown in a single district in 1916.

Mr. W. L. Taylor says:⁴

"The advantages to be derived from direct sowing as a method of afforesting new lands are in the main twofold; the avoidance of the transplanting checks to the natural development of the seedlings which are inevitable in ordinary nursery and planting operations, and the elimination of nursery expenses. There is, however, a further advantage which is of importance in these times of financial stringency and that is the very low cost per acre at which the work can be carried out in comparison with the average cost of planting."

³ Fankhauser, Dr. F. *Journal of Forestry*, page 609, 1918.

⁴ Taylor, W. L. *Forest Commission, London; Direct Sowing of Conifers (Empire Forestry Journal)*, Vol. 4, No. 1, page 106, 1925.

He reports most gratifying success with direct seeding done in England and Wales since 1920. To ensure success he states the factors are—

1. Choice of site.
2. Preparation of the ground.
3. Time of sowing.

In conclusion he states that the cost, including seed, does not exceed 35s. (\$8.40) per acre, while the cost of plants and planting can not be taken at less than £4 10s. (\$21.50).

"This difference in cost is striking, and perseverance in the attempt to perfect a technique for the direct sowing of conifers in Great Britain would, therefore, seem to be well worth while."

The experience of the United States Forest Service in direct seeding outside of the southern pine belt, has not yet been encouraging, and as a result the method has been very largely abandoned. Nevertheless, on the Tahoe National Forest in western California an experiment which indicates the possibility of direct seeding of certain species in some localities was conducted on an area of 22 acres in the fall of 1910 to Jeffrey pine by seed spot method. A large number of seedlings have become thoroughly established and have made thrifty growth. The plantation is at an elevation of 6,000 feet where there is more moisture than at lower elevations.

Broadcast and seed spot sowing of slash pine in South Atlantic and Gulf States in 1917-1918 gave excellent results. (from 3,400 to 87,000 seedlings per acre).⁵

The Dominion Forest Service has been conducting experiments to determine the possibilities of direct seeding methods in Alberta, Manitoba, Ontario, Quebec, and in New Brunswick in co-operation with the Honorary Advisory Council for Scientific and Industrial Research and the New Brunswick Forest Service, for the past few years, with varying degrees of success.

On the Cooking Lake Reserve, Alberta, on light soil, subject to severe mid-summer drought, 133 acres were seed spotted in the spring of 1924 and 200 acres in 1925 to white spruce seed. Unfortunately some of the seed used was 1923 stock and therefore of doubtful quality. However, a recount of the first area in July, 1924, shows a germination of 48 per cent and in July, 1925, of 47 per cent; of the second area in July, 1925, 60 per cent. These figures are based on the number of seed spots having one or more living seedlings. The

⁵ U. S. A. Farmers' Bulletin 1256, page 29.

1925 plot was divided between southerly and northerly exposures. A recount in September shows the seedlings on the southerly exposure to have been somewhat affected by drought, on the northerly exposure not at all.

In Manitoba direct seeding has been under investigation for a number of years. In the open plains it has been found almost a total failure. The seedlings could not withstand the drought. Under poplar, however, spruce has met with a certain degree of success.

In general, the value of the experiments conducted in Manitoba so far have been to demonstrate that direct seeding methods *for spruce* are not applicable on the open plains. The possibility of seed spotting with jack pine is now under observation with some expectation that it will be at least partially successful.

Direct seeding studies conducted at the Petawawa Forest Experiment Station, Ontario, have been conducted to investigate the possibilities of converting poplar-birch types to spruce or pine, and to determine the maximum density favorable to reproduction.

Of 17 plots from one-half to one acre each, the number of seedlings after four years runs from 340 per acre under dense shade, to over 5,000 per acre, under light shade. Although squirrels, mice and birds are very numerous and do consume considerable quantities of seed, there has been sufficient seed germination to establish a stand.

A small experiment established at Lac Tremblant, Terrebonne county, Quebec, in 1924, using white pine and white spruce seeds on a burn of 20 years, with shrubby growth seed-spotted, shows on recount in September, 1925, germination of white pine 55 per cent, white spruce 79 per cent.

An intensive investigation of direct seeding methods for the reclamation of burned over lands is in progress in New Brunswick at the present time. The study embraces various methods, severe burns recent and old, on various soils and slopes, using spruce and pine seed, poisoned and unpoisoned. The results to date may be briefly summarized as follows:

1. Seed-spot method is the most economical and reliable direct seeding method.

2. White pine seeding is unsuccessful, due to rodents.

3. Under suitable conditions of soil and shade, white spruce is highly successful. On recent burns, where shade of standing timber, even though dead, or on northerly slopes, the germination and survival after two growing seasons was from 75 per cent to 90 per cent.

On older burns (1920) with shrubby growth as a protection from drought the results of 33 sample plots after one growing season show 83 per cent of the spots bearing one or more seedlings.

4. A few of the white pine plots were successful in this burn, showing as high as 88 per cent, but the average of the 33 plots was 27 per cent.

5. On the old burns, with very shallow soil and absence of shade, neither the spruce nor pine was successful, the catch on most plots being less than 50 per cent.

6. Poison did not affect rodents. They shelled the seed. Red lead was effective with birds.

It seems apparent, therefore, that white spruce can be reproduced under certain conditions in New Brunswick by the seed spot method of direct seeding.

A report of the American Pulp and Paper Association shows the average cost of planting in the eastern states for 1923, by private companies to be \$16.02 per acre; by state's operations, \$14.16 per acre.

The cost of reseeding 200 acres in Alberta, three-fourth pounds white spruce per acre, was \$4.27.

Unfortunately, owing to its brevity, the report of reseeding given in the annual report of the New Brunswick Forest Service for 1923 is misleading as to the costs. Of a total cost of \$24.68 per acre, only 28 per cent or \$6.86 were expended in actual seeding, the remainder being distributed over surveying, establishing permanent plots, traveling and lost time. Adding to this the cost of seed, the total is \$10.81 per acre. During 1924 an attempt was made to determine the feasibility of reseeding on a commercial basis. On an area of 313 acres the cost of labor, supervision, lost time and seed was \$7.48, including seed at \$3.50 per pound. Five hundred and fifty-nine acres were sown in 1925 at a cost of \$4.85 per acre, thus reducing the costs of 1924 by \$2.63 per acre, notwithstanding that the lost time due to inclement weather was 83 man-days as against 32 man-days in 1924. The cost of seed was also 28 cents per pound higher in 1925. The reduced costs are attributed to the fact that the labor was more experienced and better organized. The cost of the New Brunswick reseeding may thus be summarized. 1923—60 acres at \$10.81; 1924—313 acres at \$7.48; 1925—559 acres at \$4.85.

It would seem, therefore, that direct seeding can be done for less than half the cost of planting and the results would indicate that the method, far from being a failure, has a place to fill, and in its place can economically replace planting.

THE CONVERSION OF JACK PINE TO RED AND WHITE PINE

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AND

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The conversion of the jack pine type to more valuable stands of red and white pine is one of the main problems of forest management on the Minnesota National Forest. This was clearly brought out in the discussion at the Lake States Rangers' Meeting held at Cass Lake, Minnesota, in April, 1925, and which resulted in a co-operative study of this problem by the Minnesota National Forest and the Lake States Forest Experiment Station.

Jack pine has and is invading many of the sites originally occupied by the better species and unless some means of control can be found, it will eventually be the dominant type on the lighter soils. This species, although valuable for paper, can never produce the better grades of lumber having the inherent superior qualities of the wood from red and white pine. This class of material will be scarce in the future, and the public will look to their holdings, the National Forests, for the supply of this product. It is therefore desirable, where stands of these species can be kept intact without too much additional expense and time, to replace the jack pine type with the more valuable red and white pine. On many acres, however, jack pine should and always will be the major crop.

The method of harvesting a crop of timber affords a means of controlling, to some extent, the succession of species that occurs on an area. As cutting may vary from the removal of a few trees to clear cutting, the object of the study was to determine the degree of cutting favorable to the desirable species and unfavorable to jack pine. The results of clear cutting were obtained from areas actually cut over. To determine the probable results of partial cutting the effects of the density of jack pine stands on reproduction were studied. Temporary plots were laid out on cut-over areas and in very open to dense stands of jack pine which were located in the vicinity of seed trees. Complete stand measurements were taken on each plot and the reproduction tallied by species. In selecting the plots special care was taken to avoid

stands that had been burned over. A summary of the plots is given in Table I.

To determine the effect of density on reproduction the plots were grouped in two density classes and the number of trees, basal area, and reproduction by species were averaged separately for each group. This division was based on a comparison of the present plots with those used as a basis in compiling the normal yield tables for jack pine. All plots with a total basal area less than 87 square feet to the acre were considered understocked. The jack pine reproduction was also averaged by crown density classes. See Table II.

Although the amount of data is limited and there is considerable variation in the reproduction on the different plots, it is still felt that the indications brought out justify the following conclusions.

Red and white pine establish themselves not only in the more open stands of jack pine but also in those well stocked. There probably is an optimum density of jack pine for the establishment and growth of red and white pine, although this is not indicated by the plots. In the better stocked stands, the reproduction of these species and others¹ averaged 1,200 and in the open stands 1,100 trees to the acre as shown in Table I. The amount of young growth in the individual stands varies widely from these averages due to the influence of factors other than density such as number, position, height, and age of seed trees, seed bed conditions, rabbits and fire, although an attempt was made to eliminate the latter. Surface soil moisture and temperature, no doubt, play an important part in the germination and establishment of the better species on the lighter soils. These factors mask any correlation that might exist between crown density and the amount of reproduction of the better species. As these species have come in under the shade of dense jack pine stands it can be expected, where other factors influencing reproduction are favorable, that they will establish themselves in similar stands partially cut over.

¹ Four per cent of balsam fir, white spruce, tamarack, and white cedar.

TABLE I

REPRODUCTION UNDER JACK PINE STANDS OF DIFFERENT DENSITIES

Minnesota National Forest

1925

Crown Density	Basal Area ⁴ per A Sq. Ft.	No. ³ of Trees per Acre	Red Pine	Reproduction per Acre ²					Total
			Seed Trees Within 3 Chains of Plot	Jack Pine		Red and White Pine and Others ⁵			
			Number	Per Cent	Number	Per Cent			
<i>Under-stocked Stands</i>									
.1	10	10	1	960	60	500	34	1,460	
.1	35	195	0	4,200	99.5	20	0.5	4,220	
.1	36	155	0	2,400	99.2	20	0.8	2,420	
.1	37	210	0	630	79	170	21	800	
.1	43	130	3	1,040	39	1,640	61	2,680	
.1	44	160	12	1,840	58	1,320	42	3,160	
.1	54	180	2	750	27	2,050	73	2,800	
.2	56	170	2	420	11	3,400	89	3,820	
.2	63	250	2	420	43	550	57	970	
.2	85	120	1	4,120	76	1,280	24	5,400	
Average	46	158	..	1,700	61	1,100	39	2,800	
<i>Well-stocked Stands</i>									
.2	112	160	0	250	100	0	0	250	
.2	116	310	6	520	76	160	24	680	
.3	105	140	2	500	81	120	17	620	
.3	116	210	2	250	60	170	40	420	
.3	120	140	2	340	58	250	42	590	
.3	120	330	3	600	41	880	59	1,480	
.3	122	140	1	560	56	440	44	1,000	
.3	130	340	7	920	68	440	32	1,360	
.3	147	330	2	290	12	2,060	88	2,340	
.3	155	400	0	1,920	65	1,040	35	2,960	
.3	173	678	4	1,220	46	1,440	54	2,660	
.4	100	475	3	500	11	4,180	89	4,680	
.4	130	360	0	0	0	1,460	100	1,450	
.4	131	340	2	40	1	6,090	99	6,130	
.5	126	430	0	40	4	1,000	96	1,040	
.6	150	420	0	0	0	1,610	100	1,610	
.7	102	479	2	0	0	290	100	290	
.8	172	580	2	0	0	0	0	0	
Average	129	348	..	400	25	1,200	75	1,600	

² Reproduction—Trees 1 inch in d. b. h. and less.³ Trees 4 inches d. b. h. and over.⁴ Cut over.⁵ Others: Balsam fir, black and white spruce, tamarack and white cedar average 4% of the reproduction.

TABLE II
REPRODUCTION UNDER JACK PINE STANDS OF DIFFERENT DENSITIES
Minnesota National Forest
1925

Crown Density	Jack Pine Reproduction ⁶ Number of Trees Per Acre ⁷	Number of Plots
.1	1,690	7
.2	1,160	5
.3	730	9
.4	180	3
.5	40	1
.6	0	1
.7	0	1
.8	0	1

Jack pine reproduction comes in more abundantly and on the average makes up a higher percentage of the young growth in the more open stands. The relation of the light available and the amount of jack pine reproduction that comes in is brought out in Table II, and the averages in Table I. Under the open stands, jack pine averaged 1,700 trees to the acre or 61 per cent of all species while in the dense stands it was less than one-quarter of this and made up only 25 per cent of the reproduction. The reaction of jack pine reproduction under partial shade also shows how dependent this species is on full light. Reproduction in the open near a dense stand was inclined in the direction of the light and the lateral branches originally on the side nearest the stand had grown in the direction of the light to such an extent that the trees looked as if they had been pruned on one side. Jack pine is less thrifty than red or white pine when it comes in under dense stands. A light cutting would reduce the amount of this species in future stands and also decrease the competition from jack pine reproduction which grows so rapidly in height especially when young that it overtops the more desirable species.

Clear cutting large areas of jack pine favors the establishment of this species and for this reason is undesirable where conversion is one of the primary objects of management. This is clearly shown by the results of clear cutting jack pine in the past. On the Chicago Box & Crating Company sale area cut over in 1919 and 1920, 99 per cent of the reproduction was jack pine, which averaged 3,400 trees to the acre. The small amount of other species is apparently due, however, to the lack of seed trees within effective seeding distance of the area. Where

⁶ Trees one inch in d. b. h. and less.

⁷ Uncurved.

the jack pine type is to be replaced by the better species, no clear cutting should be done.

The distribution and character of the jack pine stands on the Minnesota National Forest make a uniform cutting method practically impossible. The stands are usually broken in character and vary in density from a very few trees to the acre to overstocked stands. The only hope of conversion by means of natural reproduction is by establishing groups of red and white pine by a partial method of cutting, in stands suitable to such a method, and gradually enlarging the area occupied by these species in subsequent rotations.

Seed tree conditions on the Minnesota National Forest are particularly favorable for replacing jack pine by the more valuable species. The provisions of the Morris Act of 1902 and 1908 required the holding over of 5 and 10 per cent of the volume of the original stand as seed trees. These trees occur in and near many of the jack pine stands in the red pine type and will supply the seed for the conversion process. Of course where seed trees do not exist, any method of conversion by natural reproduction would fail and other methods must be used if it is deemed desirable to convert under such conditions.

Under dense stands seed bed conditions, as far as competing vegetation is concerned, are more favorable for all species. A smaller portion of the area is covered by vegetation, the amount decreasing with increased crown density. Grass is more abundant in the open stands and under these conditions usually forms a heavy sod. The chances for surviving the struggle for existence are therefore greater when dense stands are cut over. To create more favorable conditions, however, the mineral soil should be exposed as much as possible during logging.

Fire plays an important rôle in the conversion process not only directly in the destruction of young growth, but indirectly in creating favorable conditions for the germination and establishment of jack pine. Complete protection from fire is therefore essential in the stands to be converted.

CONCLUSIONS

1. The method of cutting jack pine where seed trees are present offers the best method of converting areas of this species by natural means into more valuable stands of red and white pine.

2. Clear cutting of jack pine stands perpetuates this species and is undesirable where conversion is one of the primary objects of management.

3. A light cutting in dense stands of jack pine will reduce the amount of this species in the future stand.

4. As a conversion measure any partial method of cutting should leave not less than 30 per cent of the ground area shaded by crowns.

5. Red and white pine establish themselves under jack pine stands varying in density from very open to well stock stands. For this reason where other factors of reproduction are favorable, we can expect to secure reproduction of these species under dense stands if they are partially cut over.

6. The remaining portion of the stand should be removed when the growth of the reproduction is retarded.

7. Open jack pine stands should not be cut until satisfactory reproduction of red and white pine is assured unless their condition requires immediate cutting to avoid considerable loss.

8. Seed trees of red and white pine are found on the Minnesota National Forest. In the jack pine-red pine type one or more of these trees are generally found within effective seeding distance of the jack pine stands, although there are areas on which they are entirely lacking.

9. The broken character of these stands makes a uniform silvicultural method impossible and increases the length of the period of conversion.

10. Complete fire protection of the areas to be converted is essential.

The practical application of these principles in marking is limited to a considerable extent by the conditions of the stands on the Minnesota National Forest. As indicated previously the jack pine stands vary in density from only a few trees to the acre to overstocked stands. The latter do not occur over large areas but are usually found in small scattered groups. The composition of the stands also varies widely, varying from pure jack pine to almost pure red pine. Many of the stands are also fire scarred, and must be clear cut or they would be a total loss. All of these conditions may exist on a single "forty." This diversity of stand density, composition, and conditions makes it difficult to apply the general principles outlined. Marking requires close attention to conditions on each acre and study of individual trees to secure best results.

In well stocked stands of jack pine where sufficient red pine seed trees occur, the problem is quite simple. Under these conditions the marking can be done to leave not less than 30 per cent of the ground area covered by crowns by marking overmature, suppressed, and defec-

tive trees. Trees damaged by fire to such an extent that they will not last until the next cut must be marked for cutting.

In marking the average run of stands, however, the situation is entirely different. Under these conditions we can aim at a 30 per cent crown area as our ideal and apply this in marking the small areas of well-stocked stands or those approaching this density. As a result of this marking, a crown area of not less than 30 per cent will be retained in a small portion of the area, while the majority of the stands will be clear cut except for the red pine seed trees.

The reproduction that comes in will vary considerably in density and composition. On the clear cut areas we will find jack pine coming in in abundance and gradually tapering off to a very light mixture in the stands with a 30 per cent crown area. Where red pine seed trees are present, we will find reproduction of this species fairly uniformly distributed in the young growth. On the 30 per cent areas and those approaching this, the red pine will increase with each seed year. On the more open areas it will be limited to the fail spots in the jack pine.

On the areas where there are no red pine seed trees, the only hope of conversion is to plant. If the stands are clear cut and planted to red pine this species will have to compete with the natural reproduction of jack pine which will come in abundantly. This struggle for existence will increase the mortality of the red pine and cut down the percentage of this species in the final stand. Those that remain will furnish the seed when the stand is partially cut over at the end of the rotation. After several rotations the percentage of red pine in the stands on such areas will be increased.

Jack pine never will be conspicuous by its absence, but if the principles brought out above are applied in the marking of jack pine stands it can be expected that after several rotations the proportion of the more desirable species in the stands will be greater.

CHART FOR APPLICATION OF PERCENTILE TAPER CURVES TO TREES OF ANY SIZE CLASS

By C. EDWARD BEHRE

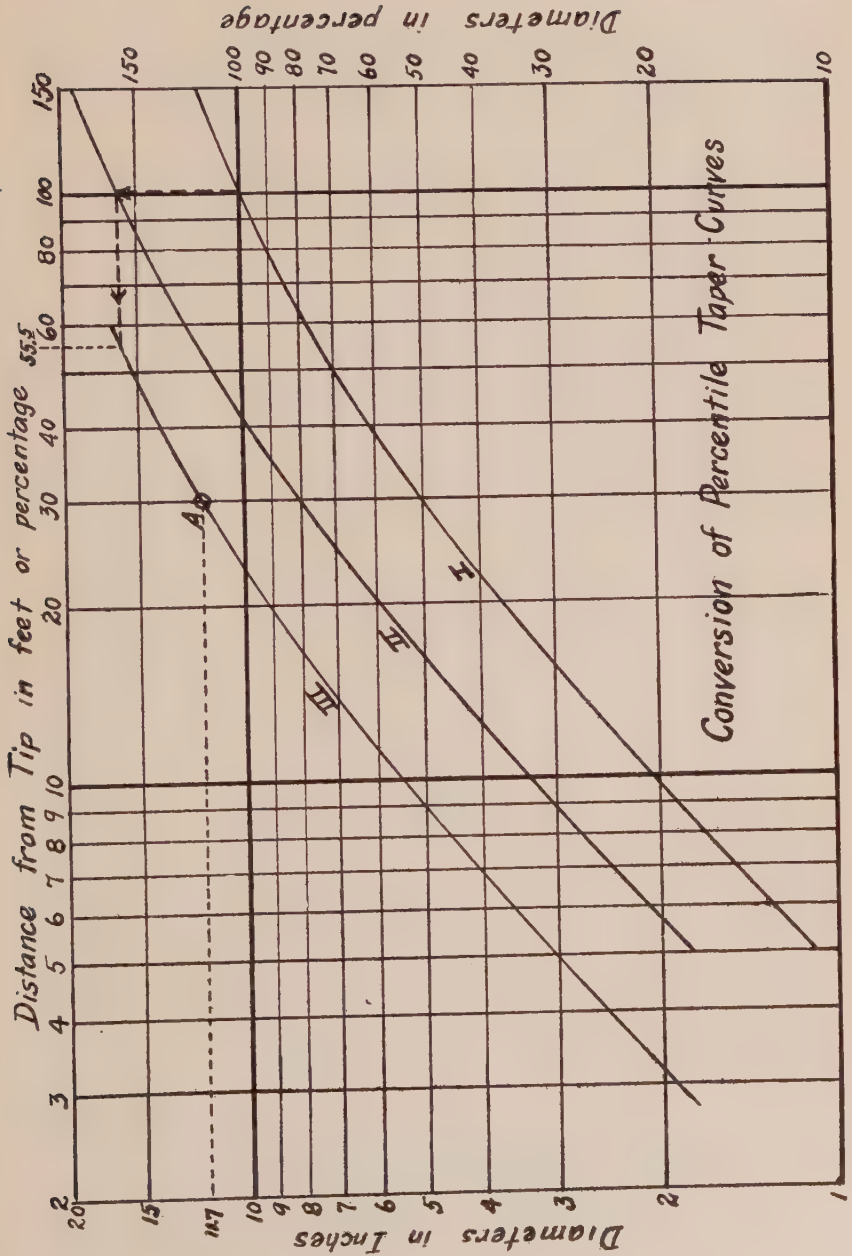
Northeastern Forest Experiment Station

The simple chart for the conversion of percentile taper curves into absolute values for any size class which is presented here was described by W. Hohendal in *Fortwissenschaftliches Centralblatt* for November 15, 1924, and the author claims no credit for originality. The method is so simple and accurate and so far ahead of anything which has been used in this country that it seems well worth while to bring it to the attention of all foresters interested in volume table work. Hohendal's entire paper, entitled "Objectives and Methods in Forest Investigation," is commended for study by all workers in forest mensuration.

Percentile taper series generally give the diameter inside bark at each tenth of the stem above breast height measured from the tip down as a percentage of the diameter inside bark at breast height. The percentile taper curves, either for different form classes or as an average for the species, are first plotted on logarithmic coordinate paper. These curves are then transferred to a sheet of transparent tracing paper. The actual diameters in inches at any height in feet for trees of any size can now be read directly by shifting the curves on the respective axes for diameters and heights.

If the percentile tapers are multiplied by the diameter inside bark at breast height, 16 inches, for example, the result will be actual diameters in inches at the respective percentages of the tree's height above breast height. This is accomplished graphically by shifting the curve in the direction of the diameter axis until the breast height point corresponds to the diameter in question. Curve I shows the preliminary plotting of the percentile tapers which is transferred to tracing paper. In position II this curve has been shifted to read actual diameters at percentile heights for a 16 inch tree. In this transformation the logarithm of 16 is added to the logarithms of the percentile taper series.

To convert the percentile heights at which the diameters are now expressed to actual heights in feet is accomplished in a similar manner by shifting the curve in the direction of the height axis until the breast height point corresponds to the total height of the tree less 4.5 feet. Thus, in position III, at A we read the diameter 30 feet from the tip



of a 16 inch tree which is 60 feet in total height as 11.7 inches. It is necessary to note that the height scale is for distances from the tip so that to read scaling diameters at different heights above ground requires first the simple conversion of the desired heights to distances from tip for each height class.

FOREST TAXATION*

BY PROF. H. H. CHAPMAN

Yale University

Reform in the taxation of forest property has been widely agitated for the past twenty years as one of the prerequisites of the practice of forestry by private land owners, but until within a very few years no substantial progress was made. The reasons are not far to seek. Any reform or adjustment in taxation is difficult, but in this case, the situation seemed to call for a fundamental change in the method of taxation involving the setting up of forest property as a special class to be given special privileges. Even after constitutional obstacles had been cleared away, there was but one plan that seemed acceptable to the public—and that was to grant these privileges only in return for special services in actual reforestation on specially classified tracts of land and then to hedge them about with plentiful restrictions so as to secure a quid pro quo for the public and prevent tax dodging.

It is time we resurveyed this problem to find out what it is that we want and how we can get it. Instead of being of primary interest to the owner of land, it appears to me that it is almost wholly a question of public welfare, in securing and developing the best use of land. The private land owner cannot easily be forced to undertake the production of forest crops against his will any more than he can be compelled to till unprofitable soil by legislative action.

The movement for public ownership of forest land by states and towns is caused by an almost complete failure of private land owners to undertake forest production as an actual business, intelligently organized or efficiently conducted, and it will be necessary to expand public ownership up to from 20 to 30 per cent of the total forest area if we are to get adequate results. But the remaining forests must not only remain private property; they must be taxed in turn to raise funds with which to purchase and reforest the public acquisitions made necessary by the failure of the former owners of these acquired lands to develop them into profitable forest property.

The one outstanding condition which must be faced in this whole problem is the abnormal depletion, exhaustion, and outright destruction of the business capital required to make forest production a going enter-

* Address at the New England Forestry Conference, Springfield, Mass.—December 11, 1925.

prise. It is true that it takes 40 to 80 years to grow crops of merchantable timber, but it is also true that we never had to wait that long in the past for these crops. In every virgin forest there is abundant young timber to provide a perpetual succession of cuttings if the business is put and kept on a sustained basis at the start. This is actually being done on the western National Forests. Furthermore such a forest, so managed, can carry just as heavy a burden of taxes as other forms of property and had our private forests been so handled there never would have arisen any problem of forest taxation.

But our forests were not so handled. Growth was ignored, the forests cut ruthlessly, the young trees consumed by fire and the stock of forest capital in growing trees which is required to bridge the period of time necessary to produce the crop was dissipated. Today we must recognize the fact that the problem does not consist in taxing a productive industry but in endeavoring to induce private capital to perform a complete double somersault and undertake to restore, over a period of 30 to 50 years of waiting, an industry which they have not even thought it profitable to maintain when they had the chance. Let us make no mistake about this. The public, not the private owner, has the problem to face. Unless true forest lands are restored as forests, they will become as worthless as the pine barrens of Michigan, which are reverting to the state for taxes. The public must have tax income. Taxes must be levied on unproductive lands, but they can only be *collected* as long as the land owner himself regards these lands as valuable. When he decides that the tax burden exceeds the prospect of income, he ceases to contribute the taxes and the public income is deflated like a spent balloon.

Therefore if the public expects to continue to draw any revenue at all in the future from cut-over or deforested land which can not be used for any other purpose, it will only be for as long a time as it takes to convince the owner of the futility of any future recovery of this outlay. Then comes bankruptcy, state ownership, or state aid and added burdens on all residual taxable property.

Forest taxation reform is therefore a matter of self preservation on the part of state and town alike. So far a good many forests have renewed themselves naturally, especially by sprouting or by the seeding in of old fields from the surrounding forest, but every indication points to steady deterioration of this volunteer natural growth and the need for actual investment in production of valuable forest crops. The purpose of forest tax legislation is to encourage the restoration of productive

forest enterprises on land on which for the most part the forest has been destroyed or the forest capital reduced to almost nothing and which will require a continuous outlay often for three to four decades with no commensurate income expected until the end of the period. Private capital must be induced to undertake this venture. The discouragements are primarily the long period of waiting which renders the investment unattractive, and next, the hazards. These are the risk of destruction by fire or by insects or diseases; witness the gypsy moth, chestnut bark disease and white pine blister rust. Finally there is the risk of an unknown burden of future taxation during the period when there is no income to meet it, thus requiring an addition to the capital investment. The prospective investor in forestry may be willing to take a chance on keeping fire out of his plantations and of controlling plant diseases, but over the threat of confiscatory taxes he has no control whatever and knows it. To ask him to undertake the production of new wealth for the sole purpose of seeing all possible profit taken in advance by heavy taxes on property values in young growing timber, puts the public in the position of the spider who invites the fly to walk into his parlor. No one denies the right of the public to levy taxes nor the need of annual revenue. The spider must live, but this is no inducement to the fly to offer himself as the victim. There seems to be a widespread apprehension that any changes in legislation looking to the removal of this menace of future tax uncertainties would mean loss of needed present annual income by the public. This attitude is not only blind to the probability of future loss of existing income if the private owner does *not* accept the burden of increasing future taxation but it also fails to comprehend the fact that all that is needed is a guarantee that present tax burdens will not be *increased*, but will be continued as they are until the income from sale of the crop is available with which to pay additional taxes.

The writer is convinced of the reasonableness and practicability of universal exemption of the value of young, immature timber separate from that of the land. Agricultural crops are not taxed until harvested and in Connecticut the value of young animals is exempt. California is seeking a constitutional amendment permitting such exemption of young timber from taxation. This measure should be adopted independent either of special classification of land, or of special requirements to practice forestry. It is merely common sense and justice and it will not even reduce the present tax revenue if made to apply only to reassessments and thus be brought into operation gradually.

If this point is conceded to owners, a universal yield tax of moderate size can then be incorporated in the tax program and from this source, eventually, the public will get back in taxes the benefit of their concessions in the matter of exempting young timber.

These two complementary measures constitute the basis for sound tax reform in forestry. So far, not a single state has adopted this general program, for the reason that the public has not yet recognized its necessity. Instead, efforts have been centered on the plan of making special concessions to individuals in the form of reduced assessed values of land or reduced rates of taxation, demanding from them in turn a total restocking of the land and then imposing upon them a yield tax which is not paid by adjoining forest owners, thus setting up two different systems of taxing forest property in the same town.

My suggestion here is that forest tax reform should first be made general by exemption of young timber and by imposing a yield tax. Then the public can go as much farther as is found necessary to induce individual private owners to undertake forest production but without penalizing them for it by extra yield taxes at the end which are not borne by owners of similar property who have merely let the forest grow up without care.

In some states conditions are so bad that these special inducements *in addition* to the tax exemptions on young timber are necessary or the private investor will never risk his capital in this venture, but instead will seek safer fields for prospective income. So we have Michigan agreeing, after the most striking demonstrations of necessity, to limit the taxes on listed pine lands to 10 cents per acre annually until the crop is mature and to pay half of this tax to the county out of the state treasury, but reasonably insisting on the previous establishment of a crop of timber on such lands as a condition of the contract.

Taxes must be ultimately paid from earned income; taxes on land, from the use of land; taxes on forest land, from the net income of forest crops; taxes on denuded and devastated forest land from crops yet to be grown. Any tax revenue which the public obtains from a tax on such property previous to the harvesting of the crop or income is an advance by the owner out of capital. Is the public going to recognize this fact and make it possible for private capital to help shoulder the burden of restoring these waste lands to productiveness or is it going to squeeze the last cent of taxes out of the land and finally compel the owner to abandon what taxation has rendered valueless to him?

Upon the outcome depends the future management and productiveness of more than two-thirds of the potential timber land in America.

CANADA'S RECOGNITION OF FORESTRY

By C. D. HOWE

Dean of the Faculty of Forestry, University of Toronto

Adequate accommodation for the Faculty of Forestry at the University of Toronto has finally materialized after many years of waiting. One who observes the quality of the architectural design from the outside of the new building and inspects its provisions for the work in hand from the inside, may well conclude that the waiting was worth while. The building is Georgian in style and is constructed of red brick and stone. The basal portion of the walls is gray limestone.

The dimensions of the building are 56 by 80 feet, containing on its three floors and basement around 18,000 square feet of floor space. Including those of the basement, 28 rooms will be occupied by the Faculty. The floors are reinforced concrete and the partitions are solid masonry, fire resisting walls of pressed light buff-colored brick. There is automatic heat control from the central heating plant; there is also an automatic ventilating system. The rooms are in units of 21 feet to the central corridor, which is eight feet wide, and are 14 feet to the ceiling. The building contains three lecture rooms, three laboratories and four staff rooms. Each lecture room accommodates 31 students. The laboratories are 40 feet long and contain 34 working places. Each laboratory carries with it *en suite* its supply and preparation room.

The ground floor contains an exhibition room, which, when completed, will contain for teaching purposes, specimens of leaves, flowers and fruits of the native Canadian trees. Another section will be devoted to a corresponding exhibit of foreign species competing in the lumber trade with Canadian woods, while a third will have reference to introduced trees used in park and street planting. A portion of the room will be devoted to a display of uniform boards, two feet long, of all the woods encountered by the building trades of the country, especially those of eastern Canada. Eventually there will be a complete set of the tropical woods used in the cabinet and furniture industries. The room will also contain exhibits of insect pests and fungus diseases which prey upon tree and wood. Not the least interesting exhibit will be that of sections of old trees, both annual rings marked to show the size of the trees at the dates of important historical events of the country.



The New Forestry Building, University of Toronto

The ground floor contains a combination library and reading room and a stack room. The library of the Faculty consists of some 2,000 bound volumes and 6,000 pamphlets. The students' common room, a lecture room, the Dean's room, clerical and secretarial offices complete the list of rooms on the ground floor. The second floor is given

over entirely to the study of dendrology, or in other words, to the study of trees, their form and structure. The supply room of the dendrology laboratory contains some 1,500 specimens of tree leaves, flowers and fruits preserved in fluids, and a corresponding number in dry condition. Besides these there are over 5,000 specimens of woods in convenient form for classroom study. The top floor contains two laboratories, those of mensuration and silviculture, located there because of the necessity of overhead light in carrying out their purposes.

The new building will give the Faculty of Forestry a status it never enjoyed before, and an opportunity to grow, not in numbers necessarily, but in service to the University, the community, the Province and to the profession at large. The first development will be along the lines of extension courses to those concerned with the wood-using industries and to those who work in various capacities in the forest. Then will come an opportunity and facilities for graduate students to work out some of the many problems that confront the profession.

The dedication of the building and the meetings in connection with it, took place on January 19, 20 and 21. The formal exercises of the official opening were participated in by the lieutenant-governor of the Province, the chief justice of the supreme court, the minister of lands and forests, the mayor of Toronto, the chancellor, the chairman of the Board of Governors and the president of the University.

The annual meetings of the Canadian Society of Forest Engineers, the Canadian Forestry Association and the annual conference of the Ontario foresters were held on the dates mentioned above. Eighty-six professional foresters were in attendance upon the meetings of the C. S. F. E.; these with the forty-three undergraduates of the Faculty made the largest gathering of foresters yet held in Canada. Somewhat more than one-half of the alumni of the Faculty were present. Mr. S. T. Dana gave a thoughtful and inspiring address on opportunities for service of the professional foresters' societies in America at a joint banquet of the C. S. F. E. and the University of Toronto Foresters Club.

REVIEWS

THE PULPWOOD SITUATION IN THE UNITED STATES AND CANADA

"How the United States Can Meet Its Present and Future Pulpwood Requirements." By Earle H. Clapp and Charles W. Boyce, U. S. Forest Service, July 29, 1924. Bulletin 1241, U. S. P. A.

"Report of the Royal Commission on Pulpwood," Canada, July 1924. Joseph Picard, Chairman; William A. Anstie, Deputy Chairman; Joseph G. Sutherland, R. W. McLellan, A. B. Kerr, Commissioners; E. H. Finlayson, Secretary.

Publications of the U. S. Forest Service in very recent years show vast improvement over older publications particularly in respect to insight into economic conditions and definiteness of statistical and other subject matter. The bulletin here reviewed is among the most notable in this respect. It constitutes a thorough economic study of the pulp and paper situation in the United States bringing together such thoroughgoing information on the past and present of the industry that accurate forecasts of the future can be made. The facts presented are so well chosen that they may safely be used to guide the policy of the individual concern in respect to location of plants and production policy. The outstanding facts are:

1. The United States uses new wood pulp equivalent to the yield from 9,148,000 cords of pulp wood of which only four and one-half million cords come from the American forests. Only an insignificant volume of other materials is used in paper manufacture. The United States produces more paper than any other country and uses 56 per cent of the world consumption.

2. Forecast of future requirements. From a very small paper requirement prior to 1870 (manufacture of paper from wood begun in the United States in the previous decade), there has been a rapid increase in paper requirements of the United States. Since 1900 the rate of increase has accelerated and as yet shows no slackening. From 1899 to 1922 per capita consumption increased from 57 to 147 pounds. It is believed there will be still some increase in per capita consumption which with the increase due to population leads to a forecast of 13½ million tons by 1950 as compared with about seven million tons now. This would require 15 to 16 million cords of pulpwood. The authors believe we should plan to produce eventually 15 million cords annually of domestic pulpwood.

3. Our timber resources and distribution thereof. This section of the report contains estimate of present pulp stands and future growth possibilities. For the period under consideration our forest area of 470 million acres is shown to be sufficient for all production purposes if it is efficiently used. The regional distribution relative to existing mills is not so good. Supplies are growing short in New England, North Atlantic and Lake states groups, while on the other hand the South and West have insufficient raw material.

4. Future growth possibilities. The Forest Service has made a careful and very conservative appraisal of the future growth possibilities of the United States. It is shown that the Northeast and Lake states can not produce the increased supplies necessary to make this country self-sustaining but that the South and Pacific Northwest are easily capable of doing so.

While the report is admirable the reviewer believes certain things might have received greater emphasis. Increased emphasis should be placed on the principle that pulpwood production properly handled is a forest builder rather than a destroyer, i. e., pulpwood should yield revenue from thinnings, forest and mill waste incident to saw timber production which will carry much of the costs of the saw timber production. Of course in areas where saw timber takes too long to grow pulp might be the main product. Sweden seems to have the best co-ordinated industry in this respect.

Speaking from the Pacific Northwest it seems undue concern is felt for the mills which must cease operations in the Northeast. Many of these must be anything but modern and the investment must have been written off the books long ago. If they are displaced by modern plants the economic loss is almost nothing. They may, however, at the same time serve as a warning against location of plants in other than sustained yield regions. Chambers of Commerce and others should in fact be informed that their communities do not constitute suitable plant locations until sustained yield productivity has been provided for.

It may also be remarked that the quality of this bulletin is largely due to the continuous collection of adequate statistics by one agency or another during the past. Even today the collection of many forest production statistics is on an unsatisfactory basis for many products. Reform is urgent in order that clear conception of industrial opportunities may be set forth in every important forest product as has been done for pulp and paper. Bulletin 1241 demonstrates in this

field one of the largest existing opportunities for expanding domestic industry.

Personal apology is due from the reviewer for late appearance of this review. This delay has been due to difficulty in securing the similar Canadian report which it was planned to review concurrently.

The Canadian report covers similar ground from the standpoint of our Canadian engineers to that covered by U. S. D. A. Bulletin No. 1241. The viewpoint is necessarily different in that whereas the United States is a great importer of pulpwood, pulp and paper, Canada is a great exporter.

The report opens with a summary of the Canadian forest resources (Table I) showing an area in the Canadian Provinces of 778 million acres as compared with 470 millions for the United States but the stand of saw timber is estimated at approximately 485 billions of feet B. M. as compared with about 2,200 billions of feet B. M. for the United States. More surprising is the estimate of pulpwood, approximately 1,418 million cords whereas the United States stand (Table 45, Bull. 1241) is estimated at 3,530.9 million cords. The latter seems, however, to overlap the saw timber estimates as far as pulp species are concerned. Even so it appears to be the case with pulpwood as without question it is with saw timber that the United States is better able to supply its needs from its own resources than by importation from Canada. For some years to come, however, Canadian supplies are on one hand of great service to the United States until it awakes to the missed industrial opportunity in this field while on the other hand they are of still greater service to Canada during the period she is increasing her population and developing well balanced industries which together will ultimately require the major portion of her pulp and paper output. In other words, looking ahead twenty-five years or more population will be better distributed throughout North America so that Canada and the Pacific Coast which now can spare raw materials and primary manufactures such as pulp and paper and lumber for the densely populated East, will by that time absorb the major portion of these raw materials themselves. This gives time for the East to restore its depleted but not ruined forests to full productivity.

This report also carefully analyzes the ownership of the pulp resources showing that over half is in complete public ownership and most of the remainder leased or licensed. Quebec leads in total volume while British Columbia, Alberta, Ontario, and Saskatchewan

follow in order. Quebec, British Columbia, and Ontario have the greatest stands available under present conditions.

Detailed discussion of conditions in each province follows. The perusal of this part of the report is well worth while both for the information it furnishes and the sidelights constantly cast on forestry practice.

In the discussion of the Canadian situation as a whole the report shows that wood consumed in Canadian mills increased from slightly over one million cords in 1913 to nearly three million cords in 1922, while exports of pulpwood grew from slightly over 800,000 cords to nearly 1,400,000 cords by 1923.

Careful discussion of forest policy, land settlement, forest fire hazards, etc., for Canada follow. This discussion sets forth in clear fashion the absolute economic necessity of continuous forest production.

Finally the Commission discusses carefully perhaps the chief object of the inquiry, namely the question of export of pulpwood. Conflicting interests have been fully considered and opinions naturally differ. The Commission appears to believe that prohibiting export would result in eventual increase in pulp manufacturing facilities in Canada to the amount of perhaps a \$150,000,000 investment. Naturally if American mills could not secure other raw material to replace this the loss of plants on this side of the line would amount to a somewhat similar figure. The Commission also believes that producers of pulpwood, particularly small producers, would receive a lower price for their product. The decision as to what action should be taken is left to governmental authority to decide.

It seems to the reviewer that action by the Canadian and American governments on this question should be such as to bring about the least interference in economic processes. So long as the pulpwood is moving in the direction of the paper market it seems that little additional freight charges on the ultimate product, if any, result from importation. It seems further that the general demand for this product should logically lead to a fairly rapid increase in forest production and generally better care of the forest. Embargo might be to the advantage of manufacturers in Canada if no retaliatory measures are taken by the United States. It may be said that British Columbia pursues such a policy with regard to logs, with the apparent result of deducting about \$2 per thousand from the value of her standing timber along Puget Sound. At least there seems to be no other explanation for

similar stumpage in the state of Washington being valued at a much higher rate. Presumably British Columbia authorities think the loss in stumpage value compensated by the increase in local manufacturing.

The reviewer believes continued forest productivity is best promoted by a broad market for all classes of products whether as raw material or in manufactured form. After the total market has reached the full continuous yield of the forest then those policies which promote local manufacture may well receive increased attention. Comparing the figures of annual forest production (utilized) in Canada with the enormous forest area indicates that the cut is only a fraction of the productive possibilities. The disinterested observer then can hardly escape the conclusion that artificial restriction of the forest products market in whatever form must be injurious. The export of some raw material will furnish the capital to build industry rapidly enough at a natural pace. Logically the thing to emphasize is conservation of forest productivity which will come quicker if the demand for forest products is keen and the individual allowed to determine where and at what price he will sell.

B. P. K.

"Tillväxtprocentens Beräkning" (The calculation of the increment per cent with the method of compound interest). By Sven Petrini. Bulletin of the Swedish Forest Experiment Station. Vol. 22, No. 4, 1925.

This is a painstaking mathematical inquiry into the correct bases of calculating increment per cent. The result of the investigation is that the compound interest method is more natural, easier to use and gives smaller errors than Presslers' formula. If the increment is large, it may be advisable to investigate a shorter period than 10 years, and in this case the error will always be smaller when using the compound interest method, which is often not the case with Presslers' formula.

The author concludes that this way of reckoning thus permits that the general series be worked out according to the preferable method of compound interest, but afterwards they can be handled more readily in practice by the simple interest method.

A. B. R.

"October 1925 Stumpage Prices at Pontarlier, France." Société Forestière de Franche-Comté. December, 1925, pp. 204-206.

Counting the franc at 4 cents, saw-timber (mostly silver fir) brought about \$19 per M. feet, while seven choice cutting acres

netted almost \$24. This compares with the price of about \$15 in 1913. In these calculations, 3.5 cubic meters of logs were counted as equal to 1,000 board feet. The converted figures are only approximate.

T. S. W. JR.

"Petition for increased duty on saw-logs and square timber." Société Forestière de Franche-Comté. December, 1925, pp. 209-210.

The President of the Society of Franche-Comté has petitioned the Minister of Commerce for a new and higher tariff on saw-timber and square timber imports. The objective is to protect the timber owners in France and to obtain increased revenue.

T. S. W. JR.

"Effect of Drainage of Swamps Upon Forest Growth." By Raphael Zon. Reclamation and Farm Engineering, February, 1926.

Many of the swamp forests of the Lake States are so low in productive value that they border on waste land and the area is in excess of 9,000,000 acres. Yet these swamp forests are the source of many valuable forest products such as pulpwood, poles, and posts. In the United States but little has been done to improve the forest growth in swamps but drainage of swamps for forestry purposes in Finland, Sweden, Norway, and Russia has been practiced for some time with marked increases in forest production from the drained areas.

Zon discusses the kinds of swamps in the Lake States and the reasons for the slow growth of the trees. There are four general types, (1) tamarack swamps, (2) black spruce swamps, (3) white cedar swamps, and (4) mixed swamps. The poor growth is caused by the cold, wet, deep peat and the injurious acids caused by the incomplete vegetable decay. Drainage removes most of the causes of the slow growth by allowing air to enter the soil and by permitting the stagnant water to flow away while fresh water brings in more mineral solutions.

The Lake States Forest Experiment Station made some records of growth on swamp trees and the effect of drainage. A typical specimen was from a tamarack 56 years old at the time of drainage with a d. b. h. of 1.1 inches and a height of 10 feet. Seven years after drainage the tree was 2.6 inches in d. b. h. and 20 feet high and the volume had increased from .036 to .379 cubic feet.

Drainage of swamps is not recommended until the area is ready for forest management and even then the drainage should be only enough to remove the superficial water.

A. E. W.

"The Last Wilderness." By Salone Ellis. Small, Maynard Co., 1925. Pages 365.

This is a novel of conservation in the early days of the Olympic Forest Reserve, Washington. The word conservation was almost as little understood by some of the forest rangers of that early day as it was by the settlers and squatters in the heavy timber on the west side of the Olympic Peninsula. Rangers were new, and far between, national forests were new and not understood, inspectors and supervisors were untried and far away. The grabbing of natural resources by anyone and everyone was the accepted practice in much of the Pacific Coast.

Into this picture comes a young forest school ranger, loaded with ideals and much book knowledge. Paul McIntyre, the hero, knew his Use Book well for he quotes pages of it—verbatim—to the squatters. He succeeds a ranger who had been transferred because of being accused of murdering a settler. Paul himself is shortly unjustly accused and tried for a similar offense. Hepsey Lee, a child of nature, the heroine of the story, is the best drawn character of the book. She struggles between her hatred of Paul, the outsider, the hated government man, and her growing love and admiration for him—with the usual story book finale.

The author has some fine passages descriptive of the mystery, the beauty and charm of the heavy forest of the Olympic region. She herself lived for many years on a timber claim in that region and went through many similar experiences of which she writes. There is a vivid account of the big tornado of February, 1921, when over five billion feet of timber was thrown down within a few hours. Mrs. Ellis published "The Logger" in 1924, and is now writing a third forest story which will deal with the forest and the sawmill.

J. D. G.

"Factors Determining Natural Reproduction of Longleaf Pine on Cut-Over Lands in La Salle Parish, Louisiana." By Herman H. Chapman, Bulletin No. 16, Yale University, pp. 1-35.

This interesting preliminary study of longleaf pine reproduction and seed trees analyzes the sources of seeding, seed production, what happens to seedlings after germination, and gives a tentative answer to the questions (of such importance to southern timberland owners), "How many seed trees should I retain per acre after logging? What kind of trees should I retain? What will they cost?" In listing dam-

age to seedlings the author speaks of fire, grazing, grass brush and tree species competition, and most interesting of all, root competition of seed trees. The author concludes that the use of fire and the use of regulated grazing, will materially assist longleaf pine reproduction. For example, on page 21, he says, "The policy indicated is light grazing during the first summer after the establishment of the seedlings, increasing slightly the second year, and as heavy as possible at any time thereafter, since this reduces the fire hazard especially during the late summer and fall. Goat grazing is more dangerous and goats, or even cattle, should be restrained in early spring to prevent injury to the terminal shoots." This is the first time that an attempt has been made to give definite figures on the number and size and general character of longleaf pine seed trees: "The general conclusion is that not less than four seed trees between 13 and 16 inches in size are required, and that of these sizes the most economical seed bearer is a 13-inch tree from 40 to 60 feet high. . . . An investment of 500 board feet per acre will be required."

Perhaps one reason why this little bulletin impresses the reviewer favorably is that it is the result of co-operation with Henry E. Hardtner over a period of more than ten years. Whether it is good policy or of practical application to use grazing and fire as an aid to reproduction is a very serious and delicate problem.

T. S. W., Jr.

"Types of Peat and Their Connection with Afforestation." By A. C. Forbes. Empire Forestry Journal, Vol. 4, No. 2.

The peats are classified into five kinds: (1) Turf peat which is a sod or mat of raw humus and living roots, (2) Heath peat or raw humus supporting heath vegetation which does not reach mineral soil, (3) Mountain peat developed under humid conditions at high elevations, (4) Sphagnum peat formed almost entirely from sphagnum and other moisture loving mosses, and (5) Marsh peat which is dead vegetable matter accumulated under water. Each kind is discussed as to its origin, characteristics and distribution, particularly in England and Ireland.

It is estimated that there are no less than 10,000,000 acres of land covered with peat in Great Britain and Ireland exclusive of low-lying bogs. The greater part of this peat development has taken place during the last 2,000 to 3,000 years, probably since the climatic optimum of the Bronze Age. Forbes concludes that either the climate has be-

come more conducive to peat formation or the surface has become more sterile thru the leaching out of the salts and finer soil particles from the soil; and that probably both are responsible. He denies the truth of the statement which is often made that trees will not grow on peat unless their roots reach mineral soil by citing instances of splendid tree crops on marsh soils in England, Ireland, and Scotland as well as in other northern countries.

Thousands of acres of sphagnum peat have been planted in Ireland and it is concluded that sphagnum peat can be successfully planted only after a portion of it has been removed and the surface brought down to within three or four feet of the water table. Marsh peat is much more susceptible to profitable planting. Experiments are cited where plantings have been made on drained swamps and bogs with different surface treatments and fertilizing. The afforestation of the peat soils of Great Britain and Ireland is considered to be a national problem especially since the poorer soils seem to cause peat formation and because the areas of peat soils seem to be increasing.

A. E. W.

"Antagonism of the Walnuts (Juglans nigra L. and J. cinerea L.) in Certain Plant Associations." By A. B. Massey. *Phytopathology*, Vol. 15, 1925, pp. 773-784.

This paper deals with the toxic action of walnut roots on certain agricultural and garden crops, as alfalfa, tomato, potato, etc. Reference is made also to injury of apple trees by the black walnut. It is shown that affected plants are always in close contact with walnut roots, indicating that the toxic substance is not generally distributed in the soil around walnut trees, but is localized in the vicinity of the walnut roots. Although the toxic substance was not isolated, it is probably juglone, or some similar substance.

The antagonism of the walnuts in certain plant associations should be of interest to foresters dealing with these trees in mixed stands. It is not at all improbable that similar reactions exist in natural stands in which walnuts occur.

H. S.

"The Development of India's Forest Resources." Compiled by the Economic Branch of the Forest Research Institute, Dehra Dun. Government of India, Central Publication Branch, Calcutta, 39 pages, 12 plates, 1925.

This report deals with the activities of the Economic Branch of the Forest Research Institute. The Economic Branch is almost exactly

comparable to the Forest Products Laboratory in the organization of the Forest Service, and it should be a matter of no little satisfaction to those who are responsible for the founding and development of the Forest Products Laboratory that the Economic Branch is patterned along identical lines. It is also significant that India has seen the advantages and the necessity of correlating the work of the Economic Branch with the other branches of the Forest Research Institute, such as Silviculture, Forest Botany, etc. This fact should reassure American Foresters of the propriety and necessity of maintaining the Forest Products Laboratory as an integral part of the Forest Service.

The subject matter is presented in eight sections, the first of which deals with the history of the Economic Branch which is of particular interest. This is followed by a short discussion of the activities of the Section of Wood Technology. Section III deals with Timber Testing; Section IV with Wood Seasoning; Section V with Wood Preservation; and Section VI with Paper Pulp. Minor Forest Products and Woodworking are treated in Sections VII and VIII respectively.

Anyone interested in the development of forest utilization in India or in tropical timbers will find this report of considerable interest.

H. S.

"Reforestation in Sardinia." Société Forestière de Franche-Comté. Dec. 1925, pp. 180-199.

Those interested in planting technique should read the interesting article by M. H. Saur. Until comparatively recently plantations had been very unsuccessful, but within the past few years by using the "Allegretti method" excellent results have been obtained by broadcast sowing. The following advantages are claimed: Expense reduced one-third, larger area covered, technique simplified and the work made less arduous, success practically assured, absence of animal damage, impossibility of fire. The key to the new method is to take advantage of local protective cover. On ground already covered with brush, acorns are sown broadcast at the rate of five hectoliters per hectare. Immediately after this a crew of some 20 laborers, working in a row, work the soil to a depth of about five centimeters, covering the seed and clearing the brush. Behind this crew two men pile the brush and burn it. The space covered by the burned brush piles is then sown after the ground is thoroughly cooled off. This expensive method appears necessary when forests have been replaced by brush fields. The article quotes from Woolsey's "French Forests and Forestry."

T. S. W., Jr.

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NOTES

PROGRAM FOR WORLD'S FORESTRY CONGRESS

The organizing committee of the World's Forestry Congress has decided to hold six sessions for the consideration of topics. Since not more than two of the four sections into which the Congress is divided will be in session at the same time, this permits three meetings to a Section. As indicated in the following program, the committee has chosen three principal subjects to be considered in each Section, one for each session, with not more than three secondary subjects which will be taken up if time permits.

SECTION I.

Principal subjects.

1. Methods in international forestry statistics.
2. International collaboration for the advance of silviculture.
3. State intervention in the management of forests belonging to private owners.

Subsidiary subjects.

4. Revenue from forests and taxation.
5. Long term forestry credit.
6. Guiding principles for the technique of silvicultural experiment.

SECTION II.

Principal subjects.

1. Unification of measurements, commercial usages, and classifications in the international timber trade.
2. Manufacture of mechanical and chemical wood pulp.
3. Resin industry.

Subsidiary subjects.

4. Unification of the customs classification of timber.

SECTION III.

Principal subjects.

1. Present tendencies in forest management.
2. The re-afforestation of bare lands.
3. Results of experimental work in the introduction of exotic forest species into different countries.

Subsidiary subjects.

4. Collection and preservation of the seed of forest trees.
5. The cork oak.
6. Methods of wood carbonization.

SECTION IV.

Principal subjects.

1. Control of torrent waters.
2. Artificial lakes in relation to afforestation.
3. The forest reserves of tropical countries.

Subsidiary subjects.

4. International organization of insect pests control.
5. Damage caused by winds and systems of protection.
6. Improvement of pasture lands.

SECOND NATIONAL RECREATION CONGRESS, WASHINGTON, D. C.

January 20-21, 1926

One of the outstanding features of this conference was the extensive attendance showing the wide interest which the subject of outdoor recreation holds for organizations interested in recreation, conservation, and social welfare activities. A few of the nationally known foresters present were H. H. Chapman, Philip W. Ayres, Harris A. Reynolds, R. S. Kellogg, E. T. Allen, R. Y. Stuart, W. T. Cox, and several men from the Washington office of the Forest Service, among whom were W. B. Greeley, J. H. Hatton, and L. F. Kneipp.

The divergent interests in this field of outdoor recreation are being harmonized and adjusted through the program fostered by this national conference. One of the examples of this feature of the work of the conference was pointed out by Colonel Greeley in his brief remarks in which he told of the work of the co-ordinating committees on National Park-National Forest Boundaries asking the representatives meeting at this conference to abide by the recommendations made by this co-ordinating committee.

A noticeable effort was made on the part of the officials of the national conference to enlarge its machinery and fortify its power by a proposal of the appointment of state committees on outdoor recreation comparable to the national committee. It is very probable that this recommendation will be carried out and the governors of the several states will be asked to make such appointments.

Another noticeable feature of the conference was that all important conservation movements attempted to get the approval of the conference. This was well brought out in the resolutions which were passed. One of the aims of the conference is to serve as the Washington headquarters for associations and organizations interested in recreation and conservation. It was stressed by several of the prominent speakers,

and noticeably by the chairman of the conference, that in this promotion of outdoor recreation it became a matter of the state's responsibility rather than the state's rights.

At the end of the conference there was a heroic effort made on the part of several delegates to have stressed more strongly the idea that the entire program of this national conference should feature the human welfare interest in the use of public lands rather than so much attention being given to the acquisition of areas, abatement of the pollution of streams, etc. It was finally brought out by the leaders of the conference that it was well understood that while this was not always mentioned it was the entire reason for the existence of the conference.

FRANKLIN MOON.

CURRENT STUMPAGE PRICES IN MINNESOTA

The Minnesota State Forest Service has recently compiled, from information furnished by its local rangers, the prevailing stumpage prices for the state. These are actual going prices furnished by men familiar with local markets and are given in the accompanying table:

AVERAGE STUMPAGE PRICES FOR MINNESOTA

February, 1926

Species	Per Cord		Per M Board Feet	
	Range	Average	Range	Average
White and Norway Pine.....	.....	.....	\$6.00-\$14.00	\$8.50
Jack Pine.....	\$0.20-\$2.00	\$1.00	2.00- 6.00	3.75
Spruce	1.00- 2.50	2.00	3.50- 6.00	5.00
Balsam .....	.25- 1.50	.90	2.00- 3.00	2.25
Popple .....	.25- 1.00	.75	1.00- 3.00	2.25
Birch .....	.40- 1.25	.90	2.00- 10.00	4.50
Tamarack .....	.25- 1.50	.80	2.00- 4.00	2.75
Cedar	1.00- 3.00	1.25	2.00- 6.00	4.25
Hardwoods .....	.20- 1.00	.70	3.00- 15.00	8.25

These prices are all for stumpage; logs cut and cordwood piled bring correspondingly higher prices. The Cloquet Forest Experiment Station, for instance, cuts logs and pulpwood during the winter and this year receives the following prices delivered at Cloquet: Logs, \$24 per M for jack pine and \$26 per M for white and Norway pine; pulpwood, \$7 a single cord for jack pine and \$22 a double cord for spruce.

Much of the jack pine and popple cut in Minnesota is consumed by box factories and lath mills while most of the rest goes into pulp-

wood and some is cut into lumber. Over 50,000 cords of these species are used annually in one locality alone and this is hauled largely by truck for distances up to 20 miles with an average haul of 10 to 12 miles. Utilization is close as a minimum diameter of five inches is allowed for box boards, four inches for lath bolts, and three inches for pulpwood. It is interesting also that white birch ties in some places now bring higher prices than tamarack which until this year has always been the desired species for this use. This is due to the fact that white birch is now treated with preservatives and since it is a harder wood than tamarack it makes better ties.

The demand for cordwood and timber in Minnesota this year is not brisk and this condition is reflected in the prices which are rather low. Many of the mills are well stocked with wood supplies and are not purchasing on the market their usual amounts.

A. E. WACKERMAN.

PACK GIVES DEMONSTRATION FOREST TO UNIVERSITY OF WASHINGTON

A demonstration forest of a million and a half board feet of timber on the Rainier National Park Highway, to serve as a "show window" of the science of forestry, and as a field laboratory in the study of forest technology, has been given to the College of Forestry of the University of Washington, by Dr. Charles Lathrop Pack, of Lakewood, New Jersey, President of the American Tree Association, according to announcement by President Henry Suzzallo yesterday.

The tract is located at LaGrande, Washington, adjoining the highway.

This is the third gift of the kind made by Dr. Pack during the last few months, similar gifts having been made to the New York State College of Forestry at Syracuse and to Yale University.

The purpose of this gift, according to Dean Hugo Winkenwerder of the College of Forestry, is to further general interest in reforestation through a public demonstration of scientific forestry, and as a field laboratory for the College of Forestry.

"The tract selected will serve this purpose admirably," Dean Winkenwerder said. "It is located on one of the principal traveled highways of the West and has a frontage on the highway of approximately one mile, presenting to the view of the passing public an area of second growth timber, one of virgin Douglas fir forest, and one that has been logged and burned over. Each of these areas will require different treatment and all are plainly visible from the highway."

Dr. Pack's idea of placing forestry in "a show window" where the passing public can readily see how science does it is a novel one, according to Dean Winkenwerder.

"It is a new idea in advertising a big national problem," he declared. "In its plan of development the College of Forestry will show the various problems involved in the handling of Douglas fir forests. Everything from nursery practice, planting, and the problems of natural regeneration to the handling of second growth forests for continuous production will be illustrated. Properly placarded with labels that will explain just what is being done, it will attract widespread public interest. This is particularly true in the state of Washington where the last stands of the nation's virgin forests are now being rapidly exhausted and where the awakening of public interest in the problems is so sorely needed. To those who may be able to visit the tract from time to time the development of the forest should arouse a sustained interest that will grow from year to year. The University will maintain a ranger on the ground during the summer months to act as fire guard and as guide to conduct visitors over the ground.

CONTROLLED BURNING IN BRITISH INDIA

Editor:

Many thanks for yours of the 10th July and for getting "The Rôle of Fire in the California Pine Forests" sent me. It has just arrived and is most interesting. I see that controlled burning has not helped much there. I hope we shall find conditions more favorable here. *Pinus longifolia*, our long leaved pine, develops a very thick fire resistant bark and evidently suffers less from light fires than the California pines. I don't think I have ever seen in our pines the under bark damage in old trees. It occurs in younger trees and I have now a second growth uniform stand, which passed through a very severe hot weather fire and has about 75 per cent of the stems with the under bark and cambium killed on one side and a race proceeding between occlusion and decay.

Also we get the base of stem damage in big trees started by a fire when some fallen log had rolled down hill and lodged there. This was very common and after fellingings now we remove all such logs. We also pile and burn slash in regeneration fellingings. Another factor with us is that we have to provide for grazing, so we have got to make the best we can out of the problem and drop ideals.

I'm going to collect my divisional forest officers this fall for two or three days and experiment with controlled burning and try and work out the technique.

Yours sincerely,

Naini Tal,
August, 1925.

F. CANNING.

FORESTRY AND ITS PROGRESS IN JAPAN

Japan, according to an official bulletin recently issued by the Bureau of Forestry, Department of Agriculture and Commerce, at Tokyo, is richer in relative area of forests to total area than America or any European country. There are 109,992,128 acres of land covered with forests. The complete area of Japan is 170,725,000 acres. Thus, 65 per cent of this entire country is in forests. Ownership of land is divided into five heads. The crown, or the imperial household, owns 3,463,280 acres; the state possesses 57,878,450 acres; the public, 11,176,020 acres; shrines and temples, 314,742 acres, and private ownership has 38,383,965 acres.

UNIVERSITY OF CALIFORNIA FORESTRY LOAN FUND

The alumni, faculty, and students of the Division of Forestry, University of California have recently created a loan fund for worthy students and named it in honor of Professor Walter Mulford. The income from the fund will be available for students to use in paying the expenses of their summer in the school camp which is work required for graduation. The fund was announced in November shortly before Professor Mulford left for a year in Europe which he will spend in studying forestry questions which have a bearing on California's problems.

NATURAL REPRODUCTION AFTER FOREST FIRES IN NORTHERN IDAHO

An intensive study was made of natural restocking by arborescent seedlings on burned forest areas in the Western white pine type in Idaho. These areas had burned severely, some only once, others twice, during the unusually bad fire seasons of 1910 and 1919. Where the double fires occurred there were practically no green trees left over large stretches of country and it was a matter of importance to discover if such large denuded tracts were seeding in again or whether it would be necessary to plant young trees. Incidentally, other outstanding

consequences of serious forest fires of a sweeping nature such as the amount of site and soil deterioration, and erosion were observed. The methods of study were for two men to run count strips in various directions and at different elevations and to determine by actual counts of the seedlings as well as by a study of the age of these seedlings and their distribution or relation to parent trees, the manner in which reproduction comes about subsequent to such large burns. It was found that the large double burn of 1910 and 1919 contained a few seedlings on the protected north and east slopes but practically none on the warmer and drier south and west aspects. The seedlings found on the north aspects showed clearly their relation to the trees which had survived the 1910 burn but which succumbed in 1910. Many such having been veteran larch trees which resist fire quite well due to their heavy bark. On the better sites double burned acres contained also white pine seedlings in spots which were remnants of the general good restocking that took place subsequent to the 1910 fire. Such groups, though relatively rare, will become a means of natural seeding within 20 years. Occasional groups of live trees have survived the first and second burns of 1910 and 1919 and these are now functioning as seed trees for the double burn but restocking is taking place only to the northward and eastward and then only on less critical sites such as lower slopes and flats or north and east aspects. On these double burns the lower south aspects present the most adverse conditions for natural restocking in that the finer particles of soil are leaching and washing down into the creeks, leaving a residue of much fine rock material which becomes quite dry and warm in midsummer thereby rendering natural as well as artificial restocking extremely slow and uncertain.

Not infrequently a heavy sod is formed on these lower exposed slopes, which is also a great hindrance in the way of natural restocking. In the case of single burns and those which were repeated at intervals of forty years and more natural restocking is generally satisfactory, showing a healthy proportion of Western white pine. Such areas, however, as have burned only once, present a serious fire menace in the great quantity of dead standing and down trees. Age counts on such seedlings as appear after the single burn indicate that the time for the bulk of the seedlings to appear stretches over a period of five years and that the greatest number of the seedlings were established during the fourth and fifth year following the fire. Aside from occasional gullyng on lower parts of draws these double burns show on

the whole very little erosion. Light seeded species of goldenrod, everlasting willow, fire weed, etc., are quick to cover the double burn. This first stage of succession is followed by brushy growth of maple, alder, June berry, snow brush and scrub maple, and these are very effective in holding the soil in place, in building it up by means of leaf mould and in sheltering the natural seedlings of conifers which eventually reclaim the land and form the final stage in the cycle of succession.

J. A. LARSEN.

COMPARISON OF CALIPER AND DIAMOND TAPE MEASUREMENTS OF SECOND-GROWTH LOBLOLLY PINE

In connection with the remeasurement of the permanent sample plots in loblolly pine in Maryland, a series of d. b. h. measurements were made on 90 trees with calipers and diameter tape. The tape readings were compared with the average of two caliper readings at right angles. For the range of diameters covered—up to 14 inches—no appreciable difference in readings was found. The aggregate of the basal areas from the tape measurements was 0.01 per cent higher than the aggregate from the caliper measurements. The differences by inch-classes were uniformly small and showed no tendency to increase with d. b. h.

L. H. REINEKE

STUDYING THE POSSIBILITY OF LOCAL SUPPLIES FOR IOWA'S WOOD-USING INDUSTRIES

Iowa always has had a considerable number of wood-using industries. At one time considerable material for these came from Iowa woodlots, but very little comes from that source now. Iowa has about two and one-half million acres of land best suited to tree growth and many of these acres now contain timber stands; a few are good, but most are culled, in small areas and material poor in quality.

To ascertain the possibilities of getting the wood-using plants in touch with quantities and kinds of materials they can use economically is a problem now being studied by the Forestry Department of Iowa State College. The work is in charge of Mr. C. L. Harrison, a graduate research fellow.

The investigation will follow three major lines. First is a survey of wood-using industries to determine whether or not they would use local materials, if so what they would require, and what their ideas are

concerning the problems of producing that material on the average farm woodlot in this state. Second will be a rather intensive survey of possibly one or two counties in the best woodlot section of the state to ascertain the possibilities of interesting owners in managing their woodlots for proper production and the possibilities of co-operative sawing and loading of wood products to overcome the **quantity problem**. Third will be a campaign to urge small sawmill operators to use more care in operating and to give them information as to proper lumber grades and standards with a view to producing a quality of product acceptable to the wood users.

To date the results from the first phase of investigation are very encouraging. There is a hearty co-operation on the part of wood-using industries in furnishing information and a decided opinion that they would use local material if put up in quantity and quality that would meet their needs.

When finished this work no doubt will be one of the most helpful things ever done toward solving the woodlot problem in Iowa.

I. T. BODE.

CONSULTING FORESTERS

The Woodlands Section of the American Paper and Pulp Association, 18 East 41st Street, New York City, is revising its list of consulting foresters in the United States and would be glad to obtain brief statements as to membership of firms of consulting foresters, the type of work in which they specialize, and the regions in which they work.

D. A. CROCKER.

DEFECTIVE COPIES OF FEBRUARY JOURNAL WILL BE REPLACED

The attention of the Editor has been called to a number of copies of the Journal in which some pages were missing due to a mistake which occurred in the assembling room of the publishers. Those who received such defective copies can get complete copies by informing the Editor.

SOCIETY AFFAIRS

MINUTES OF THE TWENTY-FIFTH ANNUAL MEETING, SOCIETY OF
AMERICAN FORESTERS, FOREST PRODUCTS LABORATORY, MADISON,
WISCONSIN, DECEMBER 16 AND 17, 1925

Morning Session, December 16

The meeting was called to order at 9:15 A. M. by the President, S. T. Dana. In the absence of the Secretary, C. R. Tillotson was elected Secretary pro tem. Reading of the minutes of the 1924 annual meeting was dispensed with.

A resolution on the death of Professor Filibert Roth was approved and a copy ordered sent to Mrs. Roth.

The annual reports of the Secretary, Treasurer, and the members of the Council in Charge of Admissions were presented. These were followed by the address of the President, and the report of the Executive Council.

The following papers were then read:

"The Interdependence of Utilization and Silviculture," by C. P. Clapp,
"The Rôle of Utilization in a National Forest Policy," by C. P.
Winslow,

"Recent Developments in Forest Products Research in Relation to
Forestry," by John D. Rue.

In discussing Mr. Clapp's paper, Mr. Fritz emphasized the close relationship between forest engineering and silviculture, and expressed the belief that the same amount of money spent in logging measures to protect small growth would be more effective than planting the land after more destructive logging methods have stripped it of young timber. He is undertaking studies to learn how logging practice in the redwood stands can be modified to prevent devastation. Mr. Preston stressed the point that good silviculture does not necessarily result from good utilization. Utilization will, more or less, take care of itself; silviculture is the big problem. Mr. Zon detailed the problem in mixed hardwoods and hemlock in the Lake States and described briefly the experiment under way at the Lake States Forest Experiment Station to determine the cost of logging small versus large timber, the grades of lumber secured from various sized logs, etc. He has tentatively come to the conclusion that timber operators are losing money on small logs.

In the discussion of Mr. Winslow's paper, the President brought out the fact that the Executive Council regards more effective forest utilization as being on a par with increased forest production as a measure of forest conservation, but believes that a formal statement to that effect, such as was suggested at the last annual meeting, would appear somewhat forced, is unnecessary, and might be misinterpreted. Mr. Richards approved the idea of wood utilizing plants making better use of the raw material; but emphasized the point that in the future forest lands must be handled to the best advantage of the timber as a crop, with utilization a secondary consideration.

In the discussion following Mr. Rue's paper, Mr. Tiemann brought out the paradox that we are striving for conservation, or silviculture, on the one hand and close utilization on the other. He believes that we are most interested in close utilization of virgin timber and conservation of young timber. Mr. Preston urged caution against sweeping statements as to the possibility of substituting hardwoods for spruce in the making of high grade paper.

Dr. Navarro de Andrade, Chief Forester, Paulista Railroad Company, for the State of Sao Paulo, Brazil, gave a short but very interesting talk on the forestry situation in Brazil. He stated that there are more than 450 tree species in Brazil, of which little is known concerning silviculture and utilization. There are one million square miles of forest in northern Brazil but the best species, parana pine and mahogany, are found in the southern and central parts. He deprecated the fact that more American foresters have not visited Brazil, and emphasized the need for the United States to send men there.

Afternoon Session, December 16

The business part of the afternoon session ~~was~~ devoted to the reading and discussion of the following reports:

- Committee on History,
- Committee on Classification of Forestry Literature,
- Editorial Board,
- Committee on Sections,
- Denver Section,
- Committee on Meetings,
- Committee on International Relations in Forestry,
- Committee on Forestry Terminology,
- Committee on Revision of the Constitution.

The statement from the Denver Section (printed in the January issue of the Journal) brought forth the comment that it was a disappointment, smacks of provincialism and unprofessionalism, and makes it appear that those endorsing it have not sold forestry to themselves. Emphasis was laid on the fact that the members of the Society will not get more out of it than they are willing to put into it, and that the Sections must take leadership in their own regions.

Mr. Fritz suggested that the chairmen of the local Sections be notified by the Secretary when members are delinquent in their dues, and that chairmen of local Sections notify each other when men move from one Section to another. Mr. Kelleter stressed the need of having the Sections see to it that men in their territories who are elected to the National Society accept election promptly when notified of it.

Mr. Chapman suggested the desirability of more specific notice of the annual meetings considerably in advance of the meetings. Mr. Richards made the point that the time of the annual meeting, usually in December, is not the best date. He believes it desirable to hold the meetings at a time when those in attendance can get into the field and learn something of local forestry conditions.

Mr. Redington and Mr. Fritz invited the Society to meet in San Francisco, in 1926, and guaranteed a good attendance and a good time.

The meeting adjourned at 2:30 P. M. for a tour of the Forest Products Laboratory.

During the evening dinner was served at the Loraine Hotel, where a delightful entertainment was provided by the members of the Laboratory and the Wisconsin Section of the Society.

Morning Session, December 17

The meeting was called to order at 9:00 A. M. by the President.

Messages to the Society from H. P. Baker, C. L. Pack, O. M. Butler, T. C. Spaulding, and H. S. Graves were read. Mr. Schmitz invited the Society to hold its 1926 annual meeting at St. Paul, Minnesota. The meeting was then thrown open to a discussion of the report of the Executive Council, which had been mimeographed and distributed the previous day, and of other Society affairs.

Motion was made and carried that the Statement of Policy as outlined by the Council be approved.

In the discussion of the Council's statement of program, Mr. Richards asked how the Society would handle the endorsement of or

opposition to any proposed forestry legislation or policy. The President replied that the position to be taken by the Society would be decided by the Executive Council or, in matters of exceptional importance and when time permits, by letter ballot of the entire membership. This position would then be made known, and the Society represented so far as might seem desirable at any meetings or hearings, by the President, Secretary, Executive Secretary, or such other member as might be designated by the Council. Sections and individual members can help greatly by calling the attention of the Council to matters on which action is needed.

Mr. Leopold pointed out in a very interesting and convincing manner the dependence of forestry on the physical and biological sciences, and gave examples of how this had been brought home to those administering the Forest Products Laboratory. He felt that this fact should be recognized in the program by some reference to co-operation with those engaged in research in the basic sciences.

On motion of Mr. Winslow, it was voted that it was the sense of the meeting that the item dealing with the practice of forestry should be expanded to include efficiency in wood utilization. It was then moved and carried that the meeting express its approval of the entire program presented by the Council with this modification and with consideration given to Mr. Leopold's comment.

Discussion then turned to the section of the Council's statement on "Forest Legislation." Mr. Preston objected to the part which referred to the Clarke-McNary Act. He felt that the Council's statement took the attitude that the Society regards the Act simply as a palliative which we hope will do some good, but in which we have no confidence. He also felt that it was unwise for the Society to state at this time that it actually believes in mandatory forestry. If the Act is properly carried out, it provides the opportunity for private forestry under the right kind of leadership, which should be supplied by the foresters themselves. At this point, by request of the Chair, Mr. Preston read the paper by D. T. Mason on "Private Forestry."

Mr. A. H. Richardson, Secretary of the Canadian Society of Forest Engineers, extended the greetings of that Society and discussed briefly its activities. The membership of the Canadian Society is now almost 250. Its official organ is the *Journal of Forestry*, and membership dues are tied up closely with the subscription rate to the *Journal*. If this should be increased several dollars many members of the Canadian Society of Forest Engineers feel that the Society should publish

its own journal. During the past year the Society has attempted as its principal activity to sell the idea of forestry to the public in every way possible, through Rotary Clubs, articles in newspapers, trade journals, etc. Mr. Richardson invited American foresters to the annual meeting of the Canadian Society to be held on January 20 and 21, in connection with the dedication of the new forestry building at the University of Toronto.

A motion was made and carried that the Society of American Foresters send appropriate greetings to the Society of Canadian Forest Engineers on the occasion of its annual meeting and congratulations to the University on the dedication of the new forestry building.

Continuing his discussion, Mr. Preston agreed with the sentiment expressed by Mr. Mason that private forestry is an intricate problem and that foresters themselves have done a lot of harm in making statements that foresters are not needed to carry out forestry in the woods. Forestry involves a long look into the future and a considerable investment of money, and no owner is going in for it unless he has confidence in the forester who is advising him. The individual forester must be backed up and supported by confidence in forestry of the whole profession, and any official remarks by the Society which indicate that we do not believe private forestry will work hurt the work of the private forester.

Mr. Preston has found that a great many of the things which foresters set up as obstacles, such as compound interest and taxes, while serious, can be overcome. He felt that the statement of the Council does exactly what Mr. Mason asks not be done. In suggesting mandatory legislation it indicates that foresters have little confidence that the Clarke-McNary Act is going to bring about the practice of forestry by private owners, and puts all the burden on the private owner. Actually the burden is on the professional foresters, to whom the Clarke-McNary Act offers a real opportunity to make good.

Mr. Richards questioned Mr. Mason's belief that in the future most of the timber will be grown on private lands. There is not enough profit in it to interest present timber owners with the exception perhaps of the paper and pulp people. There must, therefore, be much more public ownership than Mr. Mason's paper would lead one to believe. The Clarke-McNary Act is simply a compromise measure which is very good as far as it goes, but regulation of cut is the heart of continuous forest production on private lands, and for foresters

to agree even tacitly that the Clarke-McNary Act is the last word would be a serious mistake.

Mr. Chapman stated that there are certain fundamentals in forestry which are universally true, and that as professional men we can learn much from European experience. Regulation of private cutting is merely one form of exercise of the police power of the state which will be used in such ways as are necessary when the occasion arises and when the public is convinced of the necessity. Mandatory regulation could not be secured at the time the Clarke-McNary Act was passed because the public was not ready for it and the profession of forestry was not ready to say what it should be. The Society must be open-minded, must try to make progress, and must not fail to go on record as to what it believes the future may require. While the word "mandatory" is not necessarily the best to use in the statement of the Council, the principle ought to be adopted.

Mr. Stuart emphasized the fact that the Society is composed of foresters in all lines of work and offers practically the only opportunity for the development of a professional consciousness and for the free expression of our own views irrespective of the individual or organization by whom we may be employed. The opinions which we express on matters of this sort ought not to be influenced in the least by any question of expediency, but should represent our free and unbiased judgment as to just what is necessary to meet adequately the present forest situation. So far as the Clarke-McNary Act is concerned, the Council felt and has stated that the Act is good as far as it goes, but does not contain any absolute assurance that it will meet the basic requirement for forestry in the United States—that every acre of forest land be made and kept productive. This means the universal practice of forestry, and in order to bring this about, additional legislation may be required, perhaps of a mandatory character.

Further objection was expressed to the mandatory phase of the Council's statement by J. H. Allison, C. R. Anderson, and R. Payne. The Council was supported by Russell Watson, W. T. Cox, G. S. Perry, and C. A. Hoar. Mr. Cox stated that he did not believe the statement made by the Council would arouse any antagonism among lumbermen. They already understand the situation and we are no longer waving a red flag at them. It is our duty as foresters to hold up to them just as clearly as may be the present situation and let it be known that laws similar to those of Sweden or Germany may become necessary to insure continuous forest production on private lands.

Mr. Stuart proposed a change in the statement by the Council which omitted the words "of a mandatory character" and changed somewhat the first two paragraphs so as to bring out the importance of active and sympathetic participation by foresters in the administration of the Clarke-McNary Act. Motion to approve the modified statement was carried.

The meeting was then addressed by Dr. L. R. Jones, of the University of Wisconsin, who outlined his early activities in the forestry movement in New England, and expressed his continued and increasing interest in it. He then spoke of the events leading up to the survey of forest research which is being undertaken by the National Academy of Sciences, with the financial support of the General Education Board. Two men (I. W. Bailey of the Bussey Institution and Dr. Spoehr of the Carnegie Institution), are to give their entire time to this work, and one man (H. S. Graves) part time. The survey will extend perhaps over two or three years, with some months being spent in Europe,

During the noon recess a photograph of those in attendance was taken.

Afternoon Session, December 17

A telegram was read from R. S. Hosmer, sending greetings from the members of the Department of Forestry, Cornell University.

At the request of the meeting the President appointed Mr. Winslow and Mr. Fritz a committee to consider changing the last paragraph of the Council's statement on forest legislation so as to include research in utilization as well as in forest production. It was moved and carried that this paragraph be approved with the elimination of the last sentence and such modification as might be suggested by the committee just appointed. Later the changes proposed by this committee were approved.

The paper by Glen A. Smith entitled, "The Attack on the Forest Service Grazing Policy," was read by W. W. Weber.

Mr. Redington stated that the main question involved was whether there should be any attempt to meet the demands of the stockmen through legislation which would recognize and stabilize grazing as an important use of the National Forests without in any way weakening the present administrative control of grazing by the Secretary of Agriculture. Mr. Redington felt that legislation of this sort, which would also authorize the Secretary to establish reasonable grazing fees, would be of distinct advantage to the Forest Service and would not yield one

bit on the main principle of absolute control by the federal government.

Mr. Chapman read a statement by H. S. Graves expressing the view that no general legislation is needed in regard to grazing on the National Forests. Mr. Chapman questioned whether the attempt by friends of the Forest Service to secure desirable legislation might not easily result in laws that are not desired, and in paving the way for the establishment of grazing rights that might later prove very troublesome. He emphasized particularly the damage to forests which has been brought about by grazing in France, England, Italy, Spain, and other Mediterranean countries, and the extreme difficulty of regulating grazing wherever it has secured a vested right. Spain and Italy were cited as countries where the forests have been ruined by unregulated grazing and where grazing rights have become so firmly established that it is beyond the power of the public, both financially and politically, to extinguish or even to control them.

Mr. Chapman has become increasingly apprehensive about the situation in this country because we have adopted a complacent attitude toward grazing on the National Forests, partly because of the desire for income. One of the main points brought out by the committee of the National Academy of Sciences, in its recommendations concerning the administration of the National Forests, was the need of terminating the devastation by sheep in the Sierras. Afterwards came the wave to admit grazing, which has increased until there has been a great deal of over-grazing and a great amount of damage. Foresters should consider carefully the best way of controlling the grazing interests and the great danger there is in the establishment of grazing easements. We do not know what they are in America. The production of trees and the production of forage can not be placed on an equal footing on the same land; one must always be subordinated by the other. Mr. Chapman stated that he had almost come to believe that where grazing is and should be the dominant use, the Forest Service has no business with that land.

A letter from Colonel Greeley, giving his views on the situation, was read, together with the draft of a proposed bill. In addition to covering the points already discussed by Mr. Redington, this bill provided that 10 per cent of the receipts from grazing on the National Forests should be expended for the construction and maintenance of grazing improvements; authorized the creation of local boards of grazing appeals; and covered a number of minor points. Mr. Stuart made the point that the Forest Service would be in a stronger position

if the method of approach of the bill were changed somewhat so as to show clearly that it merely legalized authority which the Secretary has always had.

On motion by Mr. Chapman the meeting expressed its approval of the statement prepared by the Council on the grazing situation.

The following telegrams prepared by the Executive Council for signature by the President were then read and approved by the meeting:

To W. B. Greeley:

The Society of American Foresters in annual session here thoroughly endorses your position that there should be no interference with the present authority of the Secretary of Agriculture to exercise complete control over grazing and other secondary uses of the National Forests. It believes the announced objects sought by the organized stockmen of the West, if attained, would not only interfere seriously with the administration of the National Forests for the production of timber and the protection of the water supply but would also threaten the integrity of the entire National Forest policy.

To O. M. Butler:

The Society of American Foresters in annual session here has approved the McNary-Woodruff Bill for the extension of National Forests. It has also taken the stand that there should be no interference with the present authority of the Secretary of Agriculture to exercise complete control over grazing and other secondary uses of the National Forests.

Discussion then continued as to the desirability of grazing legislation along the lines proposed by the Forest Service. Mr. Kelleter stated that the administrative authorities had at times been confronted with many difficulties because of lack of legislation and stated that the question had been raised in the courts as to the extent of the Secretary of Agriculture's authority over grazing on the National Forests. He inquired whether it was not a strategic move to put a law on the books authorizing the Forest Service to do what it is already actually doing. Mr. Chapman thought that if any legislation is proposed it should reiterate that the purpose of the National Forests is to raise timber, not stock.

On motion by Mr. Redington the President was requested to appoint a committee of three to consider the question of grazing legislation and to report its findings, with recommendations as to the posi-

tion which should be adopted by the Society, to the Executive Council for action by the latter. (H. H. Chapman, A. W. Sampson, and Henry Schmitz were later appointed as members of this committee.)

The President stated that the suggestion had been made by Arthur Ringland, treasurer of the American Forest Week Committee, that the Society solicit a contribution of \$3 from each member, or about \$3,000 in all, to be used in furthering the activities of that committee. The following telegram to Mr. Ringland expressing the decision of the Council on this suggestion was read and approved by the meeting:

The Society of American Foresters is in thorough sympathy with the program of the American Forest Week Committee and through its members will do all it can to further that program. It can not, however, participate materially in a financial way nor does Executive Council feel justified in making direct appeal in stated sum to the members. Its recent request for increased dues urgently needed for essential Society activities in broad field of forestry will apparently be voted down.

The President next presented a suggestion by Mr. Butler that the Society take the leadership, in co-operation with other organizations, in making a comprehensive survey to find out what is being done in the practice of forestry by private owners. The President felt it is not feasible for the Society to make as comprehensive a survey as he had in mind because of lack of funds, but believed that it might be possible to collect some interesting and suggestive facts if the matter were put up to the Sections. This was approved by the meeting.

A statement by the Executive Council concerning the World's Forestry Congress was approved by the meeting.

The paper by J. S. Holmes on "National, State, Municipal, and Other Publicly Owned Forests in Relation to the National Forest Program," was read by Mr. Leopold.

Mr. Preston presented two resolutions, both of which were adopted, thanking the Forest Products Laboratory and the Wisconsin Section for their hospitality, and expressing appreciation to the editor-in-chief and other members of the editorial board for their efficient conduct of the *Journal of Forestry*.

H. J. Andrews presented a very convincing paper, supported by maps and diagrams, entitled "The Michigan Land Economic Survey." The wish was expressed for some way to get the forms and maps resulting from the survey into the hands of every forester and con-

servationist in the country. Mr. Andrews stated that the maps are available to anybody at 50 cents a piece and are on file in Lansing. The value of and need for such fundamental surveys in the solution of our land problem was very clearly brought out by this paper. Mr. Chapman moved that the President appoint a committee to confer with the officers of the Michigan Land Economic Survey to determine how the material could best be secured and made generally available to all interested. Motion carried. (P. S. Lovejoy, H. J. Andrews, and Chapin Jones were later appointed as members of this committee.) Mr. Leopold introduced a resolution which was adopted expressing the Society's appreciation and approval of the Michigan Land Economic Survey.

Papers by Hugo Winkenwerder on "Technical Education" and by Arthur Ringland on "Recreation" were, in their absence, read by title only. Two other papers, not on the program, by W. W. Ashe and G. L. Banzhaf, were also read by title.

The President stated that the desire has been expressed for some means of securing wider geographical representation on the Executive Council, which many feel is now apt to be composed too largely of Eastern, Forest Service, and Forest School men. He outlined various suggested systems of election which might correct this, and stressed particularly the system of proportional representation. Mr. Kelleter deprecated any move that might break up the continuity of the Executive Council. He thought it much better to continue under the present system and exercise discretion as to our candidates and as to our vote.

Attention was called to the suggestion that the President be elected for a two-year term.

The President then raised the question of the desirability of a Committee on Professional Practice to consider specific cases involving ethical problems, and stated that he personally felt that a committee of that sort would be very helpful. Mr. Preston stated his belief that it would be a good plan to have a standing committee on professional ethics which would not do anything unless something came up which required its action. His experience led him to believe that it was difficult to draw up any code, but that a plan to develop a code as questions come up would be very useful.

There was some discussion of membership qualifications and procedure, during which Mr. Fritz stated that the California section had felt badly that some of their nominees, whom they thought were highly qualified, were turned down because they did not have a college educa-

tion. The President stated that there must have been some misunderstanding in these cases, as the present Council is ratherly strongly opposed to imposing any educational restrictions.

The report of the committee on the Charles Lathrop Pack Prize announced that J. D. Guthrie was the successful competitor for the 1925 prize. His paper was entitled "Public Relations in Forestry."

The election of officers for 1926 was announced as follows:

S. T. Dana, President;
P. G. Redington, Vice-President;
G. H. Collingwood, Secretary;
S. B. Detwiler, Treasurer;
T. T. Munger, Member of Executive Council.

The President stated that Mr. Redington had consented to act as chairman of the Committee on Meetings for 1926.

Mr. Preston moved that the chairman of the Committee on Meetings annually request the Forest Service to send a larger number of its men to annual meetings of the Society at government expense. Motion carried. Mr. Schmitz suggested that the same sort of letter be sent to the heads of Forest Schools and state forestry departments and this suggestion was approved.

Mr. Redington suggested that it might be desirable for the president of the Society to visit all the Sections for conferences with the chairmen and other members regarding Society affairs. The President stated that however desirable such a trip might be, it was apparently impossible under present financial conditions.

The meeting adjourned at 5:25 P. M.

There were present at this annual meeting a total of 90, of whom 54 were members. Of the members, 21 were located at Madison. The remaining 33 came from the following states:

New England	3	Iowa	1
New York	4	Pennsylvania	4
Washington, D. C.	1	Lake States.....	14
North Carolina	1	Washington and Oregon....	2
Indiana	1	California	2

One visitor was from Brazil and one from Ontario.

C. R. TILLOTSON,
Secretary pro tem.

ANNUAL REPORT OF THE TREASURER FOR 1925

December 31, 1925

Receipts

Cash on hand, Washington Loan & Trust Co., January 1, 1925.....	\$ 4,976.13	
Annual dues:		
1909-24	\$ 197.15	
1925	4,301.01	
1926	63.17	
1927	1.00	
	<hr/>	4,562.33
Subscriptions to Journal of Forestry:		
Vol. 22—1924.....	36.00	
Vol. 23—1925.....	2,593.62	
Vol. 24—1926.....	400.57	
	<hr/>	3,030.19
Sale of back numbers:		
Journal of Forestry.....	109.03	
Proceedings of the Society of American Foresters.....	2.65	
Forestry Quarterly.....	48.75	
List of members.....	1.25	
	<hr/>	161.68
Advertising:		
Commercial	180.55	
Educational institutions....	240.00	
	<hr/>	420.55
Contributions:		
From a non-member.....	10.00	
From members of Society:		
To current funds.....	463.50	
To permanent fund	300.75	
	<hr/>	774.25
Interest:		
On bonds	85.00	
On deposits with Washington Loan & Trust Co.....	159.89	
On 6½% real estate note in permanent fund.....	32.50	
	<hr/>	277.39
Miscellaneous		65.88
Sale of bonds.....	\$2,035.63	
Plus accrued interest.....	19.14	
	<hr/>	\$2,054.77
Less broker's charge for sale.....	5.00	
	<hr/>	2,049.77
Prize fund from Chas. L. Pack.....		1,100.00
Total		\$17,418.17

Disbursements

Printing and distributing Journal of Forestry:	
Vol. 22, No. 8 (December, 1924).....	\$ 711.07
Vol. 23, No. 1-11 (Jan.-Nov., 1925)	5,269.24
Miscellaneous printing.....	486.60
Stationery and postage (exclusive of Journal).....	307.10
Clerical, addressograph and stenographic work.....	265.75
Telegrams, express, etc.....	57.07
Executive secretary	1,051.77

Chas. L. Pack prize.....	\$ 500.00	
Administration of prize.....	34.01	
		<hr/>
Miscellaneous:		534.01
Contribution to Botanical Abstracts	50.00	
Contribution to National Conference on Outdoor Recreation	50.00	
Purchase of back numbers of Journal.....	54.50	
Other	146.75	
		<hr/>
Petty cash		301.25
Transfer to permanent fund, Equitable Co-operative Building Association		36.93
		<hr/>
Purchase of bonds.....	\$2,030.94	2,453.00
Plus accrued interest	23.38	
Plus broker's charge.....	5.00	
		<hr/>
		2,059.32
Cash on deposit, Washington Loan & Trust Co., Dec 31, 1925	4,470.81	
Less outstanding checks.....	585.75	
		<hr/>
		3,885.06
Total		<hr/>
		\$17,418.17

Assets

Cash on hand, Washington Loan & Trust Co., Dec. 31, 1925	\$3,885.06	
Less \$32.50 which belongs in permanent fund (see below)	32.50	
		<hr/>
		3,852.56
Unpaid pledges from members for 1925		165.00
Accounts receivable:		
Annual dues, 1925.....	212.00	
Sale of back numbers of Journal, etc.....	23.35	
Advertising	16.00	
Subscriptions to Vol. 23, Journal.....	16.00	
Miscellaneous	16.00	
		<hr/>
		283.35
U. S. Treasury 4¼ gold bonds of 1932-47.....		500.00
Five \$100 U. S. Treasury 4¼ bonds of 1947-52.....		500.00
Interest accrued on foregoing bonds.....		5.30
Journals, etc., in stock:		
Journal of Forestry, 6,800 copies @ 35c.....	\$2,380.00	
Forestry Quarterly, 4,700 copies @ 35c.....	1,645.00	
Proceedings, 2,500 copies @ 35c.....	875.00	
		<hr/>
		4,900.00
Addressograph machine (estimated value).....		30.00
Addressograph stencils.....		50.00
Permanent fund:		
First mortgage 6½ real estate note due June 3, 1928..	\$1,000.00	
Interest on foregoing at present deposited in Washington Loan & Trust Co.....	32.50	
Interest on foregoing accrued	4.87	
Deposit in Equitable Co-operative Building Association	1,453.00	
Interest accrued on foregoing deposit.....	3.54	
		<hr/>
		2,493.91
Total		<hr/>
		\$12,780.12

Liabilities

Annual dues paid in advance:		
1926	\$63.17	
1927	1.00	
		\$64.17
Subscriptions to Journal paid in advance.....		597.07
Advertising, paid in advance.....		112.00
Petty cash overdrawn.....		3.73
Accounts payable:		
Printing and mailing Dec., 1925, Journal	\$545.82	
Clerical work.....	15.50	
Balance on salary, Executive Secretary.....	132.73	
Administration of Chas. L. Pack Prize fund.....	11.71	
Miscellaneous printing.....	32.30	
Miscellaneous	11.89	
		749.95
Profit and loss surplus.....		11,253.20
		<u>12,780.12</u>
Total		\$12,780.12

Audited and found correct, February 2, 1926.

B. A. CHANDLER,
S. B. DETWILER.

The most interesting and perhaps significant thing which a study of the figures brings out is that our current assets have decreased during the year about \$500. This in itself is food for thought, and when taken in connection with the fact that a part of this year's expense was met through a gift of \$1,000 and contributions of \$473.50, or a total of \$1,473.50, a situation is revealed which is a cause for real concern. In other words, from our ordinary sources of income, we failed this year to meet our expenditures by nearly \$2,000. So far as the Treasurer can see, our expenditures during 1926 must equal those of 1925 and unless our income increases more than seems likely, we shall next year be obliged to dip still further into our accumulated reserve fund to the extent of about \$1,500. The Society has a problem of financing on its hands which is apparently going to mean higher dues for its members, an intensive campaign for subscriptions and advertising, or a decrease in the number of issues and size of the Journal.

Permanent Funds

During the year with the approval of the Executive Council, the special funds reported by the Treasurer for 1924 (see page 335 of the March, 1925, Journal of Forestry) were, with the exception of the \$1,000 gift from Chas. L. Pack, segregated and with accumulated interest placed on deposit in the Equitable Co-operative Building Association of Washington, D. C., The total amounted to \$1,152. Shortly after,

\$1,000 of this was expended in the purchase of a 6½ per cent first mortgage real estate note. The balance of \$152 was left on deposit. This fund has been added to in the amount of \$301, which represents contributions during 1925 to that fund from the Society members and \$1,000 in cash which the Executive Council decided to transfer from current funds. The permanent fund now (December 31, 1925) is made up of one \$1,000 real estate note and \$1,493.91 in deposits and interest on the note and deposits.

At the time of this transaction the one \$500 bond and the five \$100 notes (these were bonds rather than notes) shown last year in the special funds were not actually cashed and deposited in the permanent fund; one thousand dollars from our general treasury was substituted for them, and they were transferred to our current assets. It will be noted in the statement of assets that \$1,000 in bonds is now carried there and can be converted into cash to meet obligations if needed, but it is intended that they remain intact to serve as an emergency fund should the occasion arise when such a fund would be sorely needed.

Contributions from Members

For Society Purposes: In response to the statement by the Council of the Society of June 10, 1925, in which pledges of contributions were solicited, \$880.50 was pledged for 1925. The donors stipulated that this fund was to be used as follows: \$107.50 for current expenses; \$427 as the Council directed; and \$346 for deposit in the Society's permanent fund. These pledges have been met to the extent of \$764.25 of which, as previously stated, \$301 has been placed in the permanent fund. A non-member contributed \$10. In addition to the pledges for 1925, \$740 has been pledged for each of the years 1926 to 1930, inclusive; \$174.50 of this is for the permanent fund. Another pledge was made of \$100 to the permanent fund to be met within the next two years. These contributions ranged from fifty cents to \$200. They have strengthened our resources considerably and the pledges for 1926-1930 will be of particular help in maintaining our present organization and activities, although they will not in themselves be sufficient to prevent our again incurring a deficit during 1926.

For Botanical Abstracts: One contribution for \$5 was received for Botanical Abstracts in response to the statement of its need for funds appearing in the September-October, 1925, number of the Journal.

Contributions by the Society

It will be noted that during the year the Society contributed \$50 each to Botanical Abstracts and to the National Conference on Outdoor Recreation.

Centering Administration of Society Activities

The need has been felt this year of the centering of the business activities of the Society. At present part of the business is centered at Washington and part at St. Paul. This is not good administration, and it leads to many vexing situations at both ends of the line. It is the judgment of the Treasurer that all of the business activities should be centered either in one place or the other.

Payment of Annual Dues

In view of the fact that the Society income will not be sufficient in 1926 to meet its expenses, the Treasurer wishes to make a special appeal to all members for the prompt payment of their annual dues. The making out of the bills for annual dues costs the Society money in the time of the Executive Secretary, paper, envelopes, and postage. It is a big job to prepare the first bills for nearly 1,000 members. It is a still bigger job to prepare second and third bills even for a part of the members because such bills must be prepared by hand. Our addressograph machine can be used only when all members are billed at the first of the year. It is not susceptible to use when only a portion of the membership must be rebilled. Our records reveal that year after year certain members (usually the same ones each year) are careless in respect to meeting this obligation promptly. It is even necessary to remind some members by letter of the fact that the constitution of the Society provides that members will forfeit their connection with the Society if their dues become one year in arrears. The preparation of these letters by hired stenographer costs the Society money that might better be devoted to other purposes. When all realize this, it is believed that 300 or 400 of the members will not have to be billed two or three times, and 40 or 50 four times. Please remit promptly upon receipt of your bill.

C. R. TILLOTSON,
Treasurer.

RESULT OF BALLOT ON AMENDMENTS AND FELLOW

The result of the balloting on constitutional amendments and Fellow by the Society are as follows:

Members to vote (approved).....	{ Yes 247
	{ No 52
Increased dues (rejected).....	{ Yes 202
	{ No 95
Fisher for Fellow (elected).....	{ Yes 220
	{ No 58

S. T. DANA.

THE CALIFORNIA SECTION BACKS THE PAID SECRETARY

From the Minutes for September 14, 1925

Affairs of the parent Society were given considerable discussion. The general feeling of the meeting was that the Society of American Foresters must employ a paid secretary to carry on the growing duties of that office and to manage the affairs of the Society in such a way as to realize our aims in making the S. A. F. an outstanding scientific society and a leader in forestry affairs. The Section went on record as being opposed to an increase of dues to \$10 and \$20 respectively for members and seniors, but pledged its support to a moderate increase. Amounts suggested were \$7.50 for members and \$12 for seniors. A raise in dues is inevitable, and all of us should feel that the raise means a stronger Society. One member suggested that our dues are far too low as compared to those of other national scientific societies and that ours should not be a "cheap" Society. Another member added that a man places a low value on something that he gets too cheaply.

EMANUEL FRITZ,

Secretary.

NORTH PACIFIC SECTION

The following are the present officers of the North Pacific Section of the Society of American Foresters:

Chairman—A. W. Cooper, Western Pine Manufacturers' Association, Yeon Building, Portland, Oregon.

Secretary-Treasurer—A. H. Hodgson, U. S. Forest Service, Portland, Oregon.

Executive Committee—L. F. Cronemiller, A. W. Cooper, and A. H. Hodgson.

A. J. JAENICKE, *Acting Secretary*.

PLEASE PAY DUES PROMPTLY

Many members have not yet paid their dues and pledges. If you are among this number it will be a material help to the Treasurer if you will remit at once. The time and money required to remind you of your obligations should be put to more constructive use. The Society's budget enforces rigid economy, and every member should give all possible aid.

S. B. DETWILER, *Treasurer*.

THE EIGHTEENTH ANNUAL MEETING, CANADIAN SOCIETY OF
FOREST ENGINEERS

January 20-21, 1926, Forestry Building, University of Toronto

PROGRAM OF THE MEETINGS

Wednesday Morning

9:00-12:30

Business—Minutes.

Report of Secretary.

Report of Treasurer.

Silviculture:

The Possibilities of Silvicultural Practice in the Forests
and the Extent to which Present Legislation Already
Provides for Such.

Paper by D. R. Cameron.

Discussion paper by R. H. Candy.

General discussion.

Paper by G. C. Piché.

Discussion paper by H. R. Wickenden.

General discussion.

Wednesday Afternoon

2:00-5:30

Reports of Committees.

Utilization:

Progress in the Utilization of the Hardwoods in Eastern Canada.

Paper by R. G. Lewis.

Discussion paper by W. Kynock.

General discussion.

Paper by R. A. Courtneage.

Discussion paper by C. H. Irwin.

General discussion.

Wednesday Evening

Annual dinner in the Great Hall, Hart House, at 7 o'clock

Thursday Morning

9:00-12:30

Business:

Estimating the Future Yield of Even Aged Stands.

Paper by T. W. Dwight.

Discussion.

The Application of Statistical Methods to Estimating.

Paper by J. A. Brodie.

Discussion paper by W. G. Wright.

General discussion.

Thursday Afternoon

2:00-5:30

Fire Protection.

Progress and Development of Forest Fire Protection Methods.

Papers by Clyde Leavitt, G. H. Prince, P. C. Caverhill

General discussion.

Officers of the Society

President—Dr. C. D. Howe.

Vice-President—G. H. Prince.

Secretary—A. H. Richardson.

Treasurer—Clyde Leavitt.

District Executives

Quebec and Maritime Provinces:

G. C. Piché, G. H. Prince, Ellwood Wilson.

Ontario:

J. H. White, Roland D. Craig, B. F. Avery.

Prairie Provinces:

C. MacFayden, D. A. McDonald, C. H. Morse.

British Columbia:

H. R. Christie, L. R. Andrews, P. C. Caverhill.

Editor:

THE BELGIAN SOCIETY OF FORESTERS

Those members of the Society who are interested in its financial statements may find food for thought in the following annual report of the Belgian Society of Foresters. Note that the Belgian Society is subsidized by the government.

*Statement for the Year 1923**Receipts*

	Francs
979 memberships at 20 francs.....	19,580.00
50 subscriptions at 20 francs.....	1,000.00
1 assessment of 12 francs.....	12.00
5 subscriptions to the library, at 18 francs.....	90.00
50 foreign memberships, for varying periods.....	1,119.39
579 memberships at 8 francs.....	4,632.00
Overdue assessments, memberships, etc.....	653.64
For advertising space in Bulletin.....	3,563.50
Sale of Bulletins.....	416.50
Subsidy from the government.....	3,000.00
	<hr/>
	34,067.03
Forward from 1921 and 1922.....	4,402.84
Total.....	<hr/>
	38,469.87

Expenses

Printing the Bulletin.....	20,201.63
Reprints, photographs, etc.....	2,432.35
Library.....	305.52
Taxes, postage, etc.....	1,816.41
Rent.....	2,300.00
Salaries of secretary, treasurer, and assistant secretaries.....	4,791.50
Conferences.....	285.00
Commissions.....	75.00
Miscellaneous.....	148.00
Moving office.....	66.90
Congress of 1923.....	650.00
Total.....	<hr/>
	33,072.31
Surplus of 1921 placed in reserve fund.....	2,309.91
Surplus of 1922 and 1923.....	3,087.65
Total.....	<hr/>
	38,469.87

The Belgian Society of Foresters sells its Bulletin to one person in every 5,000 in Belgium. The American Society of Foresters sells its Journal to only one in 80,000 in the United States.

The Belgian Society devotes about 60 per cent of its total receipts to the publication of its Bulletin. The American Society utilizes about the same percentage for the same purpose.

The Belgian Society employs about 12 per cent of its receipts as salary for secretaries and a treasurer. The Belgian Journal is now in its thirty-third year of publication.

Very truly yours,

H. T. GISBORNE.

CHARLES LATHROP PACK PRIZE

The Editor has received a number of verbal and written comments on the awarding of the Charles Lathrop Pack Prize for 1925. These comments may be of interest to the future committee in awarding next year's prize so one of them is printed here. If the award will provoke discussion as to what constitutes literary achievement in forestry Mr. Pack has done more for forestry by causing the profession to take stock of itself and of its work than merely stimulating writing.

Editor: I have looked forward with interest to the appearance of the Charles Lathrop Pack Prize article for 1925 because I believed that it would mark a literary achievement in forestry, possibly a discussion of some of the fundamental principles of forest policy to refresh us, or perhaps an article describing some notable achievement in forestry work to stimulate other foresters, or perhaps some philosophical views on the correlation of the various specializations which now make up the profession.

There are so many important and urgent questions confronting the forestry profession that I felt sure that the prize article would be a real achievement. How much could be said about the matter of grazing on the public forests, for instance, in such a way that the discussion could be considered as a sound professional opinion and have weight in legislative considerations. Or there would be opportunity for similar expression of professional opinion on the question of state and federal ownership of forests and also on the great problem on which

the foresters must sooner or later agree, the problem of the compulsory practice of forestry by private owners. Utilization and silviculture need correlation of effort and much could be written of this which would be of great advantage to both phases of forestry.

Other topics which I need not mention are, perhaps, of equal importance in forestry. I only mention these to show that I expected some thorough and basic discussion, in a clear and understandable form, which would consolidate our present knowledge of some phase of forestry, and on this basis prescribe for the future. Such an article would be of great value to the profession and would, I believe, be a great help in advancing the practice of forestry.

Mr. Guthrie's article which was selected for the prize is very interesting but it is a mere recital of the ways in which an extension forester or any other publicity agent can sell his wares. As a prize article from the profession of forestry, it was disappointing to me. No doubt "The Public Relations of Forestry" was the best article which was submitted to the committee and as such it was chosen for the prize but it would be better, I think, to withhold the prize than award it to just a "good article" and thus designate it as the best the forestry profession could produce.

In 1926 I hope that the foresters will respond with some really creditable and authoritative articles from which a prize article of real and lasting merit can be selected. What the profession needs, in my estimation and I am a young forester who has not had the opportunity to grow up with it, is a real forest philosopher, one who can take all the separate strands of forestry and weave them into a single strong cord. Specialization is incomplete without coordination and when we have so much specialization we need a forest philosopher to grasp the whole and keep it before us. For myself, I hope that the next prize will be awarded to an article of this nature, should it be deserved.

A. E. WACKERMAN.

Minneapolis, Minn.
March 2, 1926.

Forest Management Plans.
Valuation Surveys.

Economic and Statistical Studies.
Studies in Second Growth Problems.

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Forest Engineer*

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P. T. COOLIDGE

Forest Engineer

**TIMBER ESTIMATES AND MAPS
Reports on Timberland
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